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Psychological Bulletin

THE PREPARATION OF ARTICLES FOR PUBLICATION IN THE JOURNALS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION*

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INTRODUCTION

The American Psychological Association publishes seven professional journals. The success of these journals and the value of their contribution to the science and profession depend upon the cooperation between the authors and the editors in the improvement of the manuscripts presented for publication. It is the purpose of this paper to discuss these relations and to make a series of recommendations which, it is hoped, will be a positive aid in handling the endless detail that must go into the preparation of a paper. The editors feel that there is a need for a summary of this kind in view of their policy of encouraging contributions from the younger members of the profession, many of whom are writing for publication for the first time. Although the editorial staff of each journal gives careful consideration and substantial time to each manuscript submitted for publication, time, energy and money can be saved if authors will give more attention to the preparation of their manuscripts and will consult past issues of the journal to which they wish to submit an article.

The journals of the American Psychological Association are administered by a Board of Editors, which is responsible for general editorial policy in accordance with the provisions of Article X of the By-Laws and by the Council of Directors, which is responsible for the business management. Article X states, "It shall be the duty of each editor to conduct his journal in conformity with the general policies outlined by the Board of Editors. The decision of an individual editor as to the selection or rejection of manuscripts submitted by him shall be final."

Since each journal published by the Association covers a different

* The preparation of this article as a guide to authors in preparing and typing manuscripts was authorized by the Board of Editors on April 11, 1943. A preliminary copy of the article was circulated among the editors. In the main, their suggestions have been incorporated in the final copy. It should be recognized, however, that there is some divergence in style from journal to journal and that editors are free to solve the problems that arise within their own particular publications.

field and serves different objectives, prospective authors should consult past issues of the journals for guidance regarding the type of articles accepted or correspond with the editor before submitting an article. The following paragraphs characterize the fields covered by each journal:

Psychological Abstracts, which appears monthly, devotes twelve numbers and an Index Supplement to the publication of non-critical abstracts of the world literature in psychology. The abstracts are prepared by a group of abstractors and translators in each field upon invitation from the editor. Unless an abstractor has had an area assigned to him by advance arrangement there is little likelihood that his voluntary contribution will meet the rigorous technical requirements observed in the preparation of this material.

The *Psychological Bulletin*, which appears ten times during the year, contains critical and analytical summaries of the psychological literature in all its phases as well as book reviews,* notes and news and various official papers and the Proceedings of the American Psychological Association and its affiliated societies. The editor is in constant need of current announcements for the News and Notes section but reserves final judgment of their news value.

The *Psychological Review*, which appears bimonthly, publishes original contributions, chiefly of a theoretical and integrative nature. Many people, misled by the name, send lengthy book reviews to the editor of the *Review* which actually publishes no book reviews.

The *Journal of Experimental Psychology*, a monthly journal, publishes original contributions which are experimental in their nature.

The *Journal of Abnormal and Social Psychology*, a quarterly publication, devotes its attention to original contributions, book reviews, and notes in the fields of abnormal, social and clinical psychology (1).

The *Journal of Applied Psychology*, issued six times a year, publishes original contributions, book reviews and notes dealing with the application of psychology to such fields as business, industry and education.

The *Psychological Monographs* consists of longer original research and laboratory studies which appear as units. Single numbers vary in size and are gathered into volumes of about 350 pages. This mode of publication requires extensive correspondence not only with respect to editorial content, but also with regard to business arrangements.

The book reviews published by the *Bulletin*, the *Journal of Abnormal and Social Psychology*, and the *Journal of Applied Psychology*, are assigned to persons who indicate their willingness to serve in this capacity. Each editor keeps a file of competent persons and their areas of interest. If a person feels that he would like to review books he should write to the editor concerned letting him know of this willingness and giving the fields in which he wishes to prepare reviews. A commitment of this kind involves certain responsibilities on the part of the reviewer, among which promptness is important.

An article offered for editorial consideration should be significant for the audience of professional psychologists reached by the Association's

* An article on "The Preparation of Book Reviews," was published in the *Psychol. Bull.*, 1943, 40, 423–426 (3).

publications. It should define its problem or area clearly, and reach legitimate conclusions. Clarity of expression, uniformity of citation and completeness of reference are essential in a satisfactory manuscript.

Editorial Policies

Selection of manuscripts. The most important task faced by any editor is that of the selection of manuscripts for publication. All the criteria used cannot be stated in advance, as they vary somewhat from one journal to another. One of the most important factors affecting selection, common to all journals, is the amount of space available. Each journal has a certain number of pages to be filled annually. If three times as many manuscripts are received as there is space available, two out of every three must be rejected on this basis alone, without regard to their quality. It should also be evident that a well-prepared typescript cannot help but impress the editor and increase the chances that a manuscript will be selected.

Time lag. The time lag in the publication in the APA journals ordinarily varies from six to twelve months. Editors make every effort to keep the lag under a year, and generally wish to reduce it to some satisfactory minimum. Some lag is desirable. With a supply of manuscripts available in advance, the editor can make very much better adjustments, both as to editorial handling of the manuscript and space arrangements.

Order of publication. Manuscripts are usually published in order of their receipt. When a manuscript is received, the date of its receipt or of its final acceptance in case a major revision is necessary, is entered upon it and an acknowledgement is sent to the author. This date determines the order of publication, even though the editor returns the paper for minor revisions and corrections. There are certain exceptions to this practice as follows:

(1) Manuscripts for special numbers which have been solicited by the editor or a contributing editor assigned to that number are scheduled for a particular issue, without regard to the date of receipt of the manuscripts.

(2) Sometimes a short manuscript which rounds out the quota of pages available for a particular issue is printed out of the time order. In such matching of pages, editors follow the order of receipt as nearly as possible.

(3) Occasionally an article is received that is of such immediate interest and timeliness for the profession that it is given priority.

(4) Sometimes an author wishes prompt and prior publication and is willing to pay the complete cost of composition in order to ensure such publication. In such a case, the number of pages for the year is increased by the corresponding amount, and scheduled articles are printed in their regular turn and space. Since practice with regard to advance publication varies among the journals, authors interested are urged to consult the editor of the particular journal. For the time being, articles are not being accepted on the prior publication basis because of the paper shortage.

Cost of publication. Publishing scientific and scholarly contributions is an expensive procedure—principally for two reasons: their circulation is extremely limited and the cost of tables, graphs, and formulae is disproportionately high for the amount of space they occupy. For this reason, the Association requires authors to pay one-half of the composition costs for tabular matter and cuts regardless of the length of the article or the amount of such material. The Association pays the other half of the composition costs for material of this sort. Although the exact charges cannot be anticipated, experience has shown that to publish one full page of tables usually costs the author approximately $3.00. If a table is only one-half page long, then the cost to the author would be $1.50. Two half-page tables at different places in the text will cost no more than if they appeared on a single page. Formulae cost at about the same rate as that for tables and, again, may be distributed over several pages at the same rate as though they occupied a single page. To publish a full-page line cut, made from a black and white drawing, usually costs the author approximately $2.00. Several small cuts, even though they occupy one page, cost proportionately more unless a single plate can be made. Drawings furnished with manuscripts frequently are not suitable for publication due to technical requirements. If a drawing has to be done over, the author is charged the full cost of the changes made.

Cost of alterations. It is the policy of the psychological journals to charge authors one-half the cost of any alterations made in the galley proof. These charges mount very rapidly if there is an extensive series of changes because resetting costs from 10 to 15 cents for each line. The hourly rate paid by the Association to a printer is $2.50 for making corrections in the galley proof—more, we are afraid, than many of our authors earn per hour. If a change is essential, authors should count the number of characters and spaces and make an insertion or change that will use the same number of characters and spaces, since any change in the length of a line by insertion or deletion may involve resetting eight to ten lines at a cost of a dollar or more for a single correction. The author, however, does not pay for printer's errors.

For this reason, a printer slavishly follows the copy which is furnished to him. At times the author is much irritated because the printer has not corrected what seems to him to be a very obvious error, but much of what printers set seems meaningless to them, a comment that is not intended to reflect on the competence of the linotype operator. The word "ahistorical" is a case in point. This word is not in any standard dictionary and it appears to be a typographical error in which an "n" has been omitted and the space bar gone untouched—but if a printer corrected it he would be wrong. Multiply these examples indefinitely and one can understand why a printer will set "The odor res-

taurant," if that's what the copy says. The author is annoyed because the dumb printer didn't see that "Theodor" was intended.

Reprint orders. Some confusion arises in editorial and printing offices with regard to orders for reprints. It is the policy of the psychological publications to allow authors of articles which run *nine* pages or more in length, 50 reprints without covers, without any charge. For articles less than nine pages and for more than 50 reprints of articles of nine pages or more, extra charges are made in accordance with a table that comes with the reprint order. Since galley proof runs about three pages to the galley, an article must fill at least three galleys to make nine printed pages. As it is customary to run reprints at a convenient time after the journal has been printed, some delay between publication and the receipt of reprints from the printing company frequently results.

Proof. When the manuscript is about to be set in type, the editor notifies the author that his manuscript is to appear in a particular issue, informs him that he will receive the galley proof soon, and urges him to make the necessary corrections on the margins of the galleys and to return both proof and manuscript to the editorial office within 48 hours. Proof reading is a difficult job that must be done with care. All marks should be made clearly on the margins of the proof and where there is more than one correction in a line corrections should appear in order. In reading proof there should be at least two operations: (1) a silent reading without reference to copy for purely typographical errors, and, (2), a careful reading with the copy for accuracy, sense and all possible errors. With the proof there comes an order for reprints, which is to be returned with the corrected proof and manuscript. No page proof is sent to the author. The editor sees to it that the author's corrections have been made. The importance of excellent copy is shown by the fact that in some instances there are almost no corrections on the galley proof, while in others the number is very great. Clean and accurate copy saves money, time and temper at every stage of the process of publication—from the receipt of the original manuscript to its final appearance in printed form.

Preparation of Text

Style. Authors are asked to write papers as briefly as possible consistent with the adequate presentation of their material. Brevity not only increases the likelihood of publication but also reduces the amount of editorial work, the cost of printing, and lightens the burden of the reader. Since a reader's impression of a paper is influenced by its clarity and directness, the author, in his own interest, should take pains with his style in order to convey his precise meaning to his readers. Good style and form facilitate understanding. To outline the paper

several times during its writing improves organization and eliminates duplication. Particular care should be taken to avoid the constant use of simple declarative sentences of uniform length, or of a series of citations which always begin with the author's name. This habit makes for a heavy and monotonous style that is devoid of interest. By varying sentence length and structure, by employing well-chosen subordinate phrases and clauses, and by the use of vigorous and apt expression, authors help their readers and increase the effect of their articles. Authors are also urged to give articles a final and careful literary revision with a view to improving style. Often manuscripts are much improved if they are read, prior to final typing, by another person known to be a competent critic who can make suggestions for improvement in style and clarity. It would be well for all authors to read Katherine Frost Bruner's article (5) which presents the observations of an editorial assistant who struggled for some years with manuscripts prepared by psychologists.

The writing of scientific articles which present the results of investigations, has now become structured into a fairly definite pattern. This usually consists of a statement of the problem, a review of the pertinent literature, a description of the design of the experiment which includes the sampling and control devices used, a description of the measurement techniques and apparatus, a statement of the results, an interpretation or discussion of the results, and a summary which lists under serial numbers the conclusions reached.

For theoretical articles, analytical reviews, and interpretations of the existing literature the schema is not so clearly patterned. A statement describing the purposes and structure of the reviews sought for the *Psychological Bulletin* follows:

> Psychology, with its numerous subfields and special problems, has too extensive a literature for any one man to organize for himself. One of the primary functions of the *Psychological Bulletin*, is the publication of articles that will achieve integration and survey the literature in a critical and organized manner for a large number of special areas. The optimal article is one which has the character of a good handbook chapter. It is constructive and critical, and gives an accurate and systematic picture of the present status of methods, results, and interpretations in the area in question. Since the audience of the *Bulletin* is a professional one, that type of review which approaches an annotated bibliography, stating only that "A, B, and C found this, but on the other hand, C, E, and F, with different methods found that, and so on," is of relatively little value. Anyone with reasonable diligence can obtain this information from *Psychological Abstracts*. What he cannot obtain so readily is a critical analysis and interpretation of what has been done in a particular field or area.
>
> In the choice of articles to be covered in a review, some discrimination and selection is necessary. If the literature in the period covered by the review is large, it is not necessary to include all titles. Upon nearly every problem there are minor papers which contribute little to the total or which, for other reasons which a competent reviewer will discern, are not essential. Bibliographical completeness, if desired by a reader, can be attained through the bibliogra-

phies of the papers cited in the review. Although *Bulletin* articles should not include extensive reports of original data or detailed tabular analyses of data already published, they may well include suggestions with regard to topics of investigation and modes of research that will meet the deficiencies brought out in the review and thus contribute to scientific advance in the field surveyed.

Headings. The reader's comprehension of the contents of an article is substantially facilitated, if the main features of its framework are indicated by appropriate headings. Various forms of printed headings are available. Their use varies somewhat from journal to journal and with the length of the article. For long reviews of the literature, such as those published in the *Psychological Bulletin*, three kinds of headings are ordinarily used: a center head in caps and small caps, which indicates the main divisions of the content; a center head in italics which indicates larger subdivisions within the main divisions; and a side head in italics which indicates the smallest subdivisions. With shorter articles, sometimes only one type of center heading and one type of side heading are used. With very short articles only one type of heading is necessary.

Length of articles. The maximum length of an article for most psychological journals without special arrangement is 32 printed pages, which, at the maximum, is 16,000 words. If there is an extensive bibliography or many graphs and tables the number of words must be reduced proportionately. Sixteen-thousand words is the equivalent of 48 pages in elite typewriting, and 58 pages in standard or pica typing.

Smaller type. In a number of the journals material which is explanatory, descriptive of techniques, procedures and apparatus or of secondary interest is printed in smaller type. While this increases the amount of material on a page, the saving is not great, but it is a worth while practice because it helps the reader discover the author's plan. Authors should indicate material to be set in reduced type by a light pencil line in the margin of the text.

Series of statements, which are numbered or lettered, are usually set in smaller type to give additional emphasis and clarify presentation. Where each statement consists of one or more sentences, it is common practice to place these in smaller type and to begin each separate statement as a new paragraph. On page 347 of this article, under the heading *Order of publication*, an example of this practice is found. The editor's work is facilitated if, in typing, each numbered or lettered statement begins with the line, instead of running on continuously.

Quotations more than two sentences in length are commonly set in smaller type without quotation marks. If there is another quotation within a quotation set in smaller type, double, not single quotes, are used.

Style book. The journals of the APA ordinarily follow the *Manual of Style* (18). This book is a standard reference manual on matters relating

to the preparation and composition of manuscripts, as well as proof reading and editing.

Capitalization. The extensive rules for capitalization given in the *Manual of Style* (18) are not repeated here. But a common difficulty encountered in manuscripts submitted for the psychological journals, centers about words such as blank and schedule and test, in phrases such as the Stanford-Binet Test, the Vocational Interest Blank, and Haggerty-Olson-Wickman Behavior Rating Schedules. Where reference is to a specific test or form and the precise and official title is given, capitals should be used; where, however, a general reference is made to blanks or tests, capitals are not used. Authors who make many references to specific tests, are often very inconsistent in their use of capitalization to the great detriment of the editor's vocabulary.

Do not capitalize departments, as department of psychology, unless used as an address, nor titles unless they precede the name. It is Professor Clark L. Hull of Yale University, and Clark L. Hull, professor of psychology in Yale University. Colleges and schools are capitalized in phrases such as Carleton College, or the Medical School.

Compound words. Consonant with the modern trend, it is our practice to use the hyphen as little as possible. Although most compound words are written without the hyphen, authors should consult both the *Manual of Style* (18) and the dictionary in case of doubt.* Compound words involving the use of "non" do not call for a hyphen as in nonessential and nonadjacent. Widely used technical terms, though often hyphenated in popular writing, are not hyphenated in technical writing. These include such frequent terms as *setup, formboard, textbook, feebleminded.* Technical phrases composed of nouns such as *child welfare training, public welfare administration,* are not hyphenated. The hyphen is used with numbers as in a *fourth- or fifth-grade lesson,* or in such a phrase as *two- and three-year-olds.* Compounds of nouns such as *book, house, mill, room, shop, work, fold,* etc., are not hypenated, thus *notebook, classroom, workshop, woodwork, tenfold.*

Even so, it is only in the English language that a gentleman can take unto himself a gentle-woman and beget a generation of gentle children.

Punctuation. The rules for punctuation are so numerous and are presented in detail in so many manuals for writing, and also in the *Manual of Style* (18) that no summary is given here. In modern practice, fewer commas are used than was formerly the case. Often reading aloud a sentence about which there is question will facilitate the placement of punctuation marks since their purpose is to represent the pauses that make for clear reading. An error that causes some difficulty involves the placing of commas when abbreviations are used within matter that should not be separated, thus it is 2 hrs. 4 min., 3 ft. 6 in. Where

* Even the dictionaries do not agree among themselves. Cf. Ball (4).

difficulty is encountered in deciding on punctuation, recasting a sentence into two or more sentences will often eliminate the problem and add clarity to the text.

Quotation marks. Much difficulty is encountered with quotation marks, as there seems to be a widespread impression that when a single word is placed in quotation marks, single quotes should be used. Double quotes are always used for quotations from a single word up to two sentences in length, unless the particular word or passage is within a larger quotation, which is itself set off by double quotes. When a quotation is longer than two sentences it is set in reduced type and quotation marks are not used.

The comma and period are placed inside the quotation marks as a matter of typography. Thus, Pavlov said, "Conditioning in this instance was completed in ten trials." To put the period after the quotation mark is a common error. Even when a single quoted word is used at the end of a sentence the same rule is followed, as—Pavlov said that the dogs were "nervous." Editorial work is facilitated if all quotations except those a sentence or two in length, are typed so that they are separated from the text and begin on a new line.

Numbers. Numbers are always written out when they begin a sentence. If this is undesirable, reconstruct the sentence. Numbers under 10 are written out, except when they occur in a series, such as 2, 5, 8, and 10, or accompany the word "pages," in making a reference. Exact numbers should be given in arabic numerals, while round or approximate numbers are spelled out.

Abbreviations. Abbreviations are used for widely-used technical, statistical and psychological terms. A very complete list of commonly-used popular and scientific abbreviations is found in the *Manual of Style* (18). Many modern statistics texts contain lists of statistical abbreviations under headings such as *Symbols used in Formulas* as in Dunlap and Kurtz (7) or *Glossary and Symbols* as in Walker (11).

If any word which could well be abbreviated occurs frequently in a particular paper, its abbreviation may be specified the first time it occurs in parenthesis after the term and the abbreviation in the text used thereafter, e.g., psychogalvanic reflex (PGR) or electroencephalogram (EEG).

Abbreviations for many widely-used terms are set in caps without space or period as in the following examples: IQ, CR, AG, EQ, CA, MA, and ACE.

Abbreviations in caps without periods are used for scientific and governmental organizations and for military and naval terms where the context is clear, Thus, we have AAAS, APA, AAAP, SPSSI, NRC, WAC, WAVES, USN, CBS, TVA, CAA, YMCA, and YWCA.

It is permissible to abbreviate the word figure when it is followed by a number, as Fig. 2.

Words should not be abbreviated on one page and written out on the next, nor should measurements such as those of temperature be given in

Fahrenheit on one page and in Centigrade on another. If authors will make their manuscripts as consistent as possible in these respects before they are submitted for publication, much editorial labor and the cost of many alterations in proof will be eliminated.

Italics. The text of an article should be as free as possible from underlining in the typed copy. Underlining always means "set in italics." Italics can be used when terms with special meaning occur for the first time and occasionally where it is necessary to give special emphasis. Titles of books, and of published documents, and the names of journals when used in running text are usually italicized. Foreign words and phrases appearing in the text are italicized with the exception of some words and phrases which have been used so much that they have become part of our language. The *Manual of Style* (**18**) should be consulted when in doubt.

A list of foreign words of wide usage that are not italicized follows: alias, a posteriori, a priori, apropos, bloc, bona fide, camouflage, clientele, consensus, contra, creche, cul-de-sac (pl. culs-de-sac), datum (pl. data), elite, en route, ensemble, entante, erratum (pl. errata), et cetera, ex cathedra, ex officio, extempore, finis, inter, intra, laissez faire, milieu, mores, motif, nil, per annum, per capita, per cent, per diem, per se, prima facie, pro and con (tra), pro rata, role, savant, schema (pl. schemata), status quo, versus (vs.), via, vice versa. Some Latin words and phrases are always italicized. These are: *circa, et al., ibid., idem, infra, loc. cit., op. cit., passim, q.v., sic., supra, s.v.*, and *vide.* Some are not italicized such as cf., e.g., etc., i.e., viz., vs., unless ambiguity would result.

Statistical formulae. Ordinarily common and widely-used statistical formulae are not printed, because they are very expensive. If formulae have been developed especially for a particular research, or are rare or new, they may be printed. Otherwise, citation of the source is sufficient as the readers of psychological periodicals have reference books available which contain most formulae.

References to bibliography. Since the practices with respect to references and bibliography vary somewhat from journal to journal, the author should consult previous issues of particular journals for guidance. Where fewer than five references are made in the body of the article, some editors prefer the use of footnotes numbered in series to cumulated references at the end. Where more than five references are made, the references should be cumulated at the end of the article and indicated by numbers in parentheses within the body of the text. Such references are placed as near the authors' names as possible and inside the period or the comma as in the following examples:

Bunch and McTeer (**25**), in their study. . . .
The most recent experiments in the field are by Gibson (**34**).

In referring quotations to page number and citation, the following form is used:

In Robinson's experiment "there was a total . . . in varying temporal positions" (**105**, pp. 6–7).

Where there is more than one reference the numbers are in a single parenthesis separated by commas as:

that contribute to delinquency in times of peace (**24**, **34**, **51**, **90**, **127**).

Appendices. Occasionally a manuscript with an appendix is submitted. While appendices can be published in monographs, it is awkward to print them in a journal article. Authors should either incorporate such material within the body of an article or eliminate it.

PREPARATION OF TABLES*

Most scientific data are presented in either tabular or graphic form or in both. The table is an effective device for condensing data. More information can be conveyed in the same area in tabular form than in either verbal or graphic form. Its principle disadvantage is that trends are not immediately discernible. For the benefit of the reader and the pocketbook of the author and the publisher, tables should be well organized and kept as simple as possible. Since the type-setting for tables is often a special job, it can be very expensive. Presentations of data in both tabular and graphic forms is usually not necessary. Nor should data presented in the table ordinarily be quoted in detail in the text. Instead, the text may present a summary, conclusion or interpretation of what the table or graph shows.

Rules for tables. While it is difficult to lay down complete rules for table construction, the following principles are important:

1. The table should be numbered even if it is very small. The number should be placed in the center of a line.

2. The title of a table should be brief and yet complete enough so that the table can be read without reference to the text. The heading of a table should be typed thus:

TABLE XII

TITLE HERE IN CAPITAL LETTERS

3. Partition the table by suitable spacing of entries, rather than by use of lines. The various journals differ in the use of rules for tables. Some use no rules, some use horizontal rules, some use both horizontal and vertical, but in any event the author should never make any rules either horizontal or vertical with typewriter, pen, or pencil. This is an editorial matter which had better be left to the editor. The author can best help by leaving as much space as he can between columns and between headings.

* Substantial assistance in the section on the preparation of tables and graphs was had from a mimeographed copy of "Suggestions for Writing a Thesis," (**20**) prepared by a committee at Northwestern University, under the chairmanship of Claude Buxton. Exhibits I and II of a poor and a good table, respectively, on page 356 are taken directly from that article.

4. All entries in either a row or a column should be comparable and presented in comparable form.

5. Avoid the duplication within the table of entries which should go into the title of a column or row.

6. Key data or significant data (e.g., factor loadings above some "significant level") may be underlined wherever they occur in the typescript (and set in bold face type or italics in printing).

EXHIBIT I

A Poor Table

Table 23. Relation between color blindness distribution and the kind of group studied.

	Whites	Whites	Wh.	Amer. Ind.	Amer. Negroes
Number of cases	2000	1286	448	624	323
Number of color-blind individuals	159	106	35	12	12
% Color-blind	7.5	(8.20)	7.80	1.90[1]	(3.70)
Investigator	Von Planta	Miles	Haupt	Clements	Clements

1. Garth tested 399 Indians and found 1.79 per cent of them to be color-blind to red and green.
( ) Compare these two values.

EXHIBIT II

A Good Table

TABLE XXIII

Group Differences in Incidence of Color-Blindness

Group	Investigator	Number of Cases	Number Color-blind	Per cent Color-blind*
Whites	Van Planta	2000	159	7.95
Whites	Miles	1286	106	8.20
Whites	Haupt	448	35	7.80
Amer. Indians	Clements	624	12	1.90†
Amer. Negroes	Clements	323	12	3.70

* Compare particularly the percentages for whites and American Negroes.
† Garth tested 399 Indians and found 1.79 per cent of them to be color-blind to red and green.

7. If a heading or entry needs some special comment, it may be marked with an asterisk or some other symbol and the comment written as a footnote to the table. Numbers should not be used for such identifications because they might be confused with table entries.

8. Show the grouping of columns by a heading centered over all members of the group; show the grouping of rows by a single entry at the left on the first of such rows. Extra spacing of groups of rows or columns will help greatly here.

9. For convenience in typing or type-setting a square shape or a rectangular shape approximating the shape of a half-page or page is most useful. A very long and very narrow table, or very short and very broad table presents difficulties in type-setting. Examples of good and poor practice are found in Exhibits I and II.

10. Do not put too much in a single table; use more tables and make a single point or a small number of points by means of each one.

Table organization. In using a table an author, too often, tries to crowd in so much material that the table has to be set lengthwise on the page. More frequently than not this wastes much space because the table seldom contains enough material to fill the entire width of the page. Readers also are annoyed if they have to turn a page sidewise. By repeating the first column, which should contain the values of, or a description of the independent variable, a wide table can be broken into two parts which can be fitted on the page in the proper manner. Often by rearranging a table, it can be made to convey its information more clearly to the reader and save cost of composition. The same data are presented in two sample tables in Exhibits I and II. The latter is clearly much superior to the former.

There is some variation in practice in arranging the seriation in a table. Formerly the practice of putting the smaller quantities at the top and moving downward to the larger quantities was common. This is still the procedure with tables of logs, squares, reciprocals, etc. and with descriptive numbers or letters and with dates as

Type A	Size 1	1910
Type B	Size 2	1911
Type C	Size 3	1912

But tables with class interval designations which formerly began with the lowest interval at the top, increasingly are printed with the largest class interval at the top, i.e. tables tend more and more to be set up like graphs. This practice is followed in most modern statistical texts. Bi-variate tables, almost without exception, increase their magnitudes from left to right, and from bottom to top. Many tables presenting the results of an analysis of variance follow a similar practice.

Separate pages. Tables should be typed on separate pages and directions for their insertion in the text given to the printer by means of a device to be described later. Typing tables on separate pages often saves much time in the preparation of a manuscript, since the text can be extensively revised without disturbing the tables.

The author must avoid a wording in the text which exactly fixes the position of a table. It is common for a manuscript to read: "These results are shown in the following table:" This implies that the table will follow the colon. In the page make-up, however, the colon may come so close to the bottom of a page that there is no room for the table. All tables should be provided with numbers and referred to by numbers. The author should also avoid the use of "the table above" or "the table below" because these references are often made incorrect by the rearrangement of the text and table sequence required in pagination.

Preparation of Cuts and Graphs

The material submitted to editors from which cuts are to be made varies widely in skill of execution. Many authors supply ink copies of rough working drawings of graphs, charts, equipment or conceptualized schemes. Sometimes the editor returns these to the author with a request to furnish more acceptable copy; at other times the editor in desperation runs the illustrations as submitted because he has learned what a slow and unsatisfactory process extended correspondence with authors can be. And this despite the existence of excellent manuals and discussions of the principles of graphic presentation. Many textbooks on statistics contain sections which contain rules for the construction of graphs and illustrative materials. The most complete and detailed source for principles, layout and drawing are the two pamphlets issued by the American Standards Association*† (**15, 21**), which also contains illustrations of good and bad practices. Psychologists and laboratories that have occasion to prepare many graphs or charts for publication should have copies of these pamphlets. Several extensive texts or manuals are also available (**2, 6, 8, 12**).

Design. The illustrations for an article should be prepared with the same attention to detail given any other process accompanying publication. A carelessly constructed graph or a poor half tone often raises a question as to the care with which the whole project has been accomplished. The author should plan an illustration with its final appearance on the printed page clearly visualized. The size of the page, which differs for the various journals, has a definite relation to the size of the units which are to be selected for both the horizontal and vertical axes. The space available should then be considered in terms of utilizing a full-page, a half-page, a one-third page or even smaller part.

Colored cross-section paper. These considerations show the futility of considering even for a moment a graph or other drawing on standard ruled cross-section paper. While these papers are a laboratory necessity and are satisfactory for theses or reports on 8½×11 paper, they have no place in a publisher's office. Since the spacing of lines on cross section paper seldom bears a useful relation to the page-size, an author would better start with a blank piece of illustration board before him; upon it he can inscribe the lines he wants where he wants them.

Aside from these aesthetic considerations, cross-section paper is unsatisfactory because the making of a cut is a photographic process in which the various

* Modern textbooks on Engineering or Mechanical Drawing contain chapters on Charts and Graphs. Usually these are condensations of the pamphlets of the American Standards Association.

† The APA has a representative on the Committee on Standards for Graphic Representation of the American Standards Association.

colors photograph differently. Hence there may be an unexpected change in the appearance of the grid in an otherwise well-made illustration. One author made lines with India ink on red one-millimeter ruled paper. Since some colors affect photographic plates just as black does, when the drawing was reduced one-half, there appeared a harsh grid of very black lines ½ millimeter apart upon which one could barely see the lines that had stood out so incisively in the original drawing. Because blue-lined grids on a white background do not photograph, an author who expects to find the grid coordinates in his printed article is disappointed if he uses such paper.

Size. After an author has determined the size of a full printed page in the journal of his choice and has chosen the pertinent illustrations from among his many working papers, and has decided whether he wants a full page or a definite fraction of it devoted to his graph, he is ready to prepare copy for the printer. A drawing should be at least twice the size of the final printed area and may well be made even larger than this. It is not even necessary to restrict one's self to integral values, for every rectangle constructed on an extension to the diagonal of the original page size (see Fig. 1.) will preserve the same proportions in reduction. The draftsman has only to mark the desired width in inches at the bottom of the copy. If the original drawing is made several times larger than the final graph the small inaccuracies in the drawing are much reduced or eliminated in final copy. A beginner frequently uses all the space for the drawing proper and then finds that he has no space for the scale designations. From the beginning space for the scale designation should be provided for by lightly ruling a line with pencil at the bottom and at the left side of the area covered by the grid as shown in Figure 2.

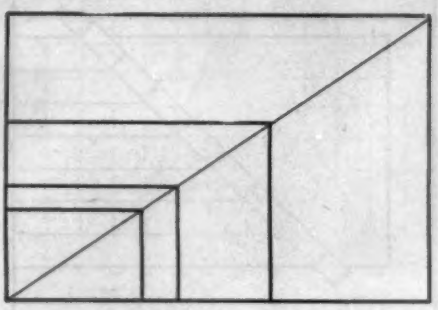

FIG. 1. Any of the rectangles shown will preserve their relative dimensions when enlarged or reduced.

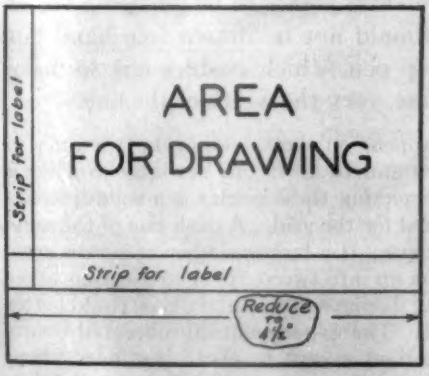

FIG. 2. The cut will include the lettering in the "strip for label" when the copy is marked as shown. It will not include the direction to the printer to "reduce to 4½"."

Making the grid. After the strips are laid off for the scale designations one often finds himself with awkward dimensions, say 6 11/16 inches in the horizontal and 12⅝ inches in the vertical direction. To use familiar units as ½ inch or ¾ inch for the divisions of the ordinates is, of course, impossible. It is a mistake to restrict one's self to these units.

By laying a scale in a diagonal direction across the area so that the zero mark is any place on the x-axis and the inch mark corresponding to the number of spaces wanted is on the top-most horizontal ruling, then a series of dots placed along the scale at the inch marks as shown in Figure 3, will serve to locate the divisions of the ordinates, equally spaced but separated by what would be very cumbersome units measured in inches. No general rule can be formulated concerning the number of lines needed in the grid except to say "use the smallest number consistent with the function of the graph." These lines should first be made with a pencil, and should not be inked in until the rest of the graph has been completed. In many graphs every fifth or even every second line is made heavier, but there is no point to doing so unless some recurrence such as every seventh day or every twenty-four hours needs to be emphasized. In colored coordinate paper where evey fifth or tenth line is made heavier, the intervening lines are construction lines.

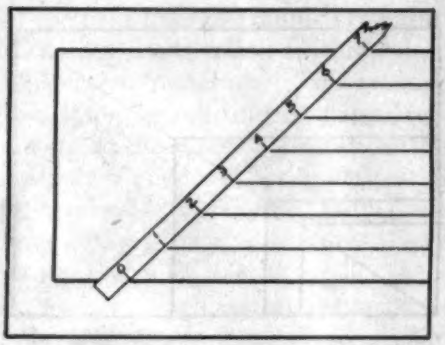

FIG. 3. A quick method of preparing coordinates when dealing with odd dimensions.

Inking in the graph. The experimental points to be plotted are best indicated by a small circle which should not be drawn free hand but with an instrument known as a drop pen, which enables one to make very small circles and at the same time, vary the width of the line.

If more than one set of data is to appear on the same graph, it is safer to make both sets with the same drop pen and to fill in one set later to make a solid circle. The best line to use in connecting these circles is a solid line distinctly heavier than that which is planned for the grid. A dash line of the same weight is best used for a comparison curve. If a large number of curves cross and recross it is better to break the graph up into two parts or to use some other method of presentation. Many confusing displays of the latter type could better be represented by means of bar charts. The experimentally observed points should be connected by short straight lines except in those instances where some demonstrable law, the mathematical statement of which is known, underlies the whole phenomenon or where the results have been smoothed, in which case it is customary to represent the smoothed or generalized curve by a continuous line and indicate the actual observations by small circles, triangles or squares.

Surface graphs. With frequency distributions we are more interested in the area under the curve than in the height of the ordinates. The surface character of such curves can be shown better if they are made to stand out in some way from the background.

A convenient way to accomplish this effect is to ink in the coordinates only in those positions which show if the surface were really cut out of some opaque material and laid on the coordinate system. Some authors cross-hatch the surface or fill it in solidly in black. If the cross-hatching is carefully done with lines that are not too heavy nor too close together a satisfactory appearance results. It is, however, very difficult to keep the cross-hatching absolutely uniform. Filling in with solid black is never satisfactory because of the over-contrast with the white areas of the page. It is satisfactory for the author to furnish a plain drawing even though he wishes it to appear shaded on the printed page. He has only to write "Use Ben Day No. 27 diagonal screen" and indicate the area which is to be so covered. The engraver will then take care of the matter by the Ben Day process.* The best way to indicate the use of toning screens and any printed lettering is to write the instructions on a transparent cover for the drawing. Often a piece of tracing paper is attached by mucilage to the top or left hand edge of the drawing. This serves as a protection for the drawing and at the same time allows for exact specification because the rough lettering on this sheet is used as a guide to the draughtsman who makes the final lettering on the copy.

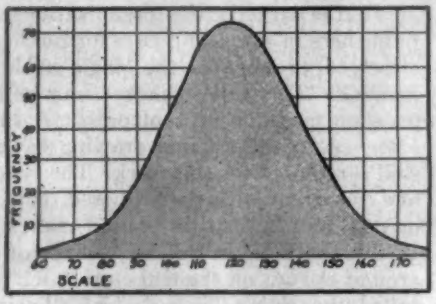

FIG. 4. The effect obtained by using a Ben Day screen and inking only those coordinates which would show if the surface were cut from opaque material.

Lettering by author. The most troublesome feature of furnishing professional appearing copy lies in the problem of lettering, which is a skill which, though once mastered, slips away easily if not practiced consistently. To expect any more than an occasional psychologist to have preserved this skill is asking too much. These facts have caused most authors to fall back on the typewriter for making their labels. A typewritten label, unfortunately, never looks right in print. The characters are usually either too large or too small, are uneven in density, do not have a crisp contour and are too close together. Further, they do not lend themselves to design because the space between the characters cannot be varied. Certain templates or guides which furnish the outlines of satisfactory characters which can be traced by means of special

* The Ben Day process, named after its inventor, Benjamin Day, is a mechanical method for producing shaded, mottled or stippled backgrounds.

pens are available. The most widely used system is known as Wrico. Others are the Leroy System and the Ames Lettering Device.

Lettering by publisher. Probably the best resolution of all these difficulties is for the author not to attempt the lettering. Two courses are then open. One can finish the drawing except for the lettering, indicate what it is to be in the manner described above, and send it to the editor who can find someone to do it. Or an engineering drawing instructor may know of an engineering student who could do the job or perhaps be willing to do it himself.

In the larger cities organizations are available which work closely with publishers in preparing cuts for publication. Type has been developed which closely approximates the single-stroke engineering character usually recommended. This type, handset, can be appropriately letter-spaced, and an impression made on a proof press. A small strip, or a single character, is then attached to the original drawing by means of rubber cement. Considerable skill is required for this work. The type is available in a variety of sizes so that one consistent with the proposed reduction can be chosen. Whether solid caps or caps and lower case is used makes no difference. First-class maps are invariably lettered in this way. Type of the same font as the text can also be set around the cut on the make-up bench in the printing shop. But this operation, called "justifying," is one which all printers dread and for which the publisher has to pay at a very high hourly rate. Because it is so inefficient psychological journals make no use of it.

Half tones. All photographs must be reproduced by making a copy on metal of the original furnished by the author. Invariably some detail is lost in this operation so that only photographs of greatest depth of focus and greatest contrast should be furnished. This detail is best accomplished by a professional photographer but for those who make their own, one simple consideration deserves more attention than it gets. Apparatus should be moved to a neutral background or else the background should be furnished on the scene by using a backdrop of blankets or drapes of some other kind. A little attention to composition should vastly improve the appearance of our journals. Half tones are expensive: if worth while at all, some care should go into their preparation.

A photograph should be inspected in detail by using four sheets of white paper to form a border which can be shifted until the best composition is selected. Use no more area than is needed, even if it is a small part of the original print. Indicate the limits of this area on the borders of the print and mark "crop here," but do not cut the photograph yourself. In general the horizontal dimension as it appears in print should be about two-thirds the width of an entire line of type, and should be so marked. Best results are obtained from a "glossy" or ferro-typed print. The maker of the print should know that it is for reproduction by half-tone. Any retouching should be done before the ferro-typing.

On the back of each illustration the author's name, his address, the figure number, and the title of the figure, should be legibly written. Because photographs are so expensive to reproduce, line-drawings should be substituted wherever possible.

Preparation of the Bibliography

In editing articles with long bibliographies, more difficulty is encountered with the bibliography than with any other part of the article. Many bibliographies have the following faults: (1) incorrect alphabetization, (2) inconsistent or incorrect insertion of titles prepared by boards, committees, and anonymous writers, (3) incorrect citation, (4) reference numbers not consecutive, (5) articles by the same author not arranged by date of publication, (6) lack of correspondence between text numbers and entries in the bibliography. Often a single error involves renumbering almost the whole of the bibliography and a change in all the citations in the text. For example, in a recent *Bulletin* article, 323 corrections were made in a bibliography alone. This involved much correspondence with the author, and much loss of time for both editor and author.

Authors are urged to prepare bibliographies with great care. Bibliographic references should first be written on separate cards, a procedure which makes checking new insertions and alphabetizing easier and more accurate. In early copies of the manuscript, spaces between parentheses, as ( ), can be left for inserting references. Just before the final copy is typed, the alphabetization and citations should be carefully checked, the cards numbered consecutively, the bibliography copied, and the appropriate numbers inserted in the text, which can then be copied in final form. While bibliographies are read and edited with care, *editors* cannot verify all references and must place the responsibility for accuracy upon the author. Since references are useless unless correct, every reference in the final manuscript should be verified against the source with regard to the following details: spelling, journal, date, volume number, page numbers, and punctuation, and, above all, accents. References in a foreign language should be checked with especial care (see 6 in Exhibit III).

Style of citation for references to periodicals. In 1938 the Board of Editors adopted the form of citation presented in the World List of Scientific Periodicals, 1900–1933, as official for the journals of the American Psychological Association. It had been used by the *Psychological Abstracts* for some years (17). McGeoch (10), then editor of the *Bulletin*, prepared a list of the journals more commonly used by psychologists. Until his death, McGeoch collected additional abbreviations for journals frequently appearing in psychological references, a practice continued by the present editor. Because the list is several times its original length and because it is convenient to have it readily accessible along with other material on style, it is published here. For journals not

on the list published here,* reference can be made to the *World List of Scientific Periodicals* (22), which is available in most libraries.

FORMS OF CITATION FOR JOURNALS

Abh. sächs. Ges. (Akad.) Wiss.
Acta biotheor.
Acta Med., U. R. S. S.
Acta ophthal., Kbh.
Acta oto-laryng., Stockh.
Acta psychiat., Kbh.
Acta psychol., Hague
Acta psychol. Keijo
Actualid. méd. peruan.
Actualités sci. industr.
Africa
Allg. Z. Psychiat.
Amer. anat. Mem.
Amer. Ann. Deaf
Amer. Anthrop.
Amer. Ass. Adult Educ. Adjustm. Serv. Rep.
Amer. J. Dis. Child.
Amer. J. med. Sci.
Amer. Mus. Novit.
Amer. J. Obstet. Gynaec.
Amer. J. Ophthal.
Amer. J. Optom.
Amer. J. Orthopsychiat.
Amer. J. phys. Anthrop.
Amer. J. Physiol.
Amer. J. physiol. Opt.
Amer. J. Psychiat.
Amer. J. Psychol.
Amer. J. Sociol.
Amer. Nat.
Amer. orthopsychiat. Ass. Monogr.
Amer. Scholar.
Amer. sociol. Rev.
An. Inst. Psicol. Univ. B. Aires
Anat. Anz.
Anat. Rec.
Anesth. & Analges.
Ann. Eugen., Camb.
Ann. math. Statist.
Ann. méd.-psychol.
Ann. N. Y. Acad. Sc.
Ann. Ophthal.
Ann. Otol., etc., St. Louis
Ann Surg.
Année psychol.
Annu. Rev. Biochem.
Annu. Rev. Physiol.
Arbeitsphysiologie
Arch. Anat. Physiol., Lpz.
Arch. Anthrop. crim. Lyon
Arch. Antrop. crim. Milano
Arch. argent. Psicol. norm. pat.
Arch. Augenheilk
Arch. brasil. Med. nav.
Arch. brasil. Psychiat.
Arch. Crim. Neuropsiquiat., Quito
Arch EntwMech. Org.
Arch. exp. Path. Pharmak.
Arch. Fisiol.
Arch. gen. Neurol. Psichiat.
Arch. ges. Psychol.
Arch. int. Pharmacodyn.
Arch. intern. Med.
Arch. ital. Biol.
Arch. ital. Psicol.
Arch. Kinderheilk.
Arch. KrimAnthrop.
Arch. Lab. Psicol., B. Aires
Arch. Naturgesch.
Arch. néerl. Phon. exp.
Arch. néerl. Physiol.
Arch. Neurobiol.
Arch. Neurol. Psychiat., Chicago
Arch. Ohr.-, Nas.-, u. KehlkHeilk.
Arch. Ophthal., N. Y.
Arch. path. Anat., Bratislava
Arch. Path. Lab. Med.
Arch. Physiol. norm. path.
Arch. Psicol. Neurol. Psichiat. Psicoter.
Arch. Psychiat. Nervenkr.
Arch. Psychol., Geneve
Arch. Psychol., N. Y.
Arch. Rass.-u. GesBiol.
Arch. Speech
Arch. Surg., Chicago
Arkh. biol. Nauk

* In case journals are not on either list, the author is urged to make the citation as complete as possible, even to the inclusion of obviously unnecessary information, since the editor can cut unnecessary material more readily than he can supply missing material.

Ass. Stud. intern. Secretions
Athenaeum
Atti Congr. int. Criminol., Roma
Atti Soc. ital. Progr. Sci.
Auk
Aust. Coun. educ. Res. Ser.
Aust. J. exp. Biol. med. Sci.
Aust. J. Psychol. Phil.

Beih. Z. angew. Psychol.
Beih. Z. angew. Psychol., Abh. Wehrpsychol
Beih. Zbl. Psychother.
Ber. I. Kongr. exp. Psychol.
Ber. Kongr. Psychol.
Bio-chem. J.
Biol. Abstr.
Biol. Bull. Wood's Hole
Biol. Rev.
Biol. Zbl.
Biometrika
Biotypologie
Bird-Banding
Bol. Cent. nav., B. Aires
Bol. Educ. Pernambuco
Bol. sanit., B. Aires
Boll. Mal. Orecch.
Boston Soc. psych. Res.
Brain
Brazil-med.
Brit. J. Child. Dis.
Brit. J. educ. Psychol.
Brit. J. med. Psychol.
Brit. J. ophthal.
Brit. J. physiol. Optics
Brit. J. Psychol.
Brit. J. Psychol. Monogr. Suppl.
Bul. Spital. Boli Mint. Nerv. Sibiu
Bull. Acad. Belg. Cl. Sci.
Bull. Acad. Sci. U. R. S. S.
Bull. Amer. Mus. nat. Hist.
Bull. (Ann.) Soc. ent. Belg.
Bull. biol.
Bull. Biol. Méd. exp., U. R. S. S.
Bull. Inst. gén. psychol.
Bull. Menninger Clin.
Bull. N. Y. Acad. Med.
Bull. neurol. Inst. N. Y.
Bull. Off. intercommun. Orient. prof. Brux.
Bull. Pan-Amer. Un.
Bull. Purdue Univ.
Bull. Sch. Educ. Ind. Univ.
Bull. Soc. Sci. Liége
Bur. Stand. J. Res., Wash.

Carnegie Instn Publ.
Čas. Lék. čes.
Cath. educ. Rev.
Cath. Univ. Amer. educ. Res. Monogr.
Cervello
Character & Pers.
Child Develpm.
Child Develpm. Abstr.
Child Develpm. Monogr.
Child Res. Clin. Ser.
Chin. J. Psychol.
Cold Spr. Harb. Sympos. quant. Biol.
Commonw. Aust. Coun. sci. industr. Res.
Comp. Psychol. Monogr.
Condor
Conf. int. Psychotech.
Congr. Hyg. ment., Paris
Contemp. Rev.
Contr. psychol. Theor.
Copeia
C. R. Acad. Sci., Paris
C. R. Acad. Sci. U. R. S. S.
C. R. Soc. Biol. Paris
C. R. premier Congr. int. Rech. psych.
C. R. Soc. Phys. Hist. nat. Geneve
Crítica social.
Cult & Educ.
Cursos Conf.

Delaware St. med. J.
Dtsch. med. Wschr.
Dtsch. Z. Nervenheilk.

E. Afr. med. J.
Ecol. Monogr.
Ecology
Educ. Adm. Supervis.
Educ. Res. Bull., Ohio St. Univ.
Educ. Trends
Education
Eksp. med. Kharkov
Elem. Sch. J
Elgin. Pap.
Encéphale
Encycl. Brit.
Endocrinology
Ergebn. Biol.

Erkenntnis
Eugen. News
Eugen. Rev.
Evolut. psychiat.

Fact. industr. Mgmt.
Family
Fed. Proc. Amer. Soc. exp. Biol.
Finska LäkSällsk. Handl.
Fiziol. Zh. S. S. S. R.
Forsch. Fortschr. dtsch. Wiss.
Forsch. Völkerpsychol. Soziol.
Fortschr. Neur. Psychiat.
Forum. Educ.

Gaz. clin., S. Paulo
Genet. Psychol. Monogr.
Genetics
Gesundh. u. Wohlf.
v. Graefes Arch. Ophthal.
Growth
Gyógyászat

Handb. biol. ArbMeth.
Handb. vergl. Physiol.
Harv. Alumni. Bull.
Harv. educ. Rev.
Harvey Lect.
Heart
Hoppe-Seyl. Z.
Hospitalstidende
Hospitalstindende, Dansk oto-laryng. Selsk. Forh.
Hum. Biol.
Hum. Factor, Lond.
Humanidades

Imago. Lpz.
Indian J. Psychol.
Industr. Psychol.
Industr. Psychotech.
Int. Encycl. unif. Sci.
Int. J. indiv. Psychol.
Int. J. Psycho-Anal.
Int. Z. Indiv.-Psychol.
Int. Z. Psychoanal.
Irish J. med. Sci.

J. abnorm. Psychol.
J. abnorm. soc. Psychol.
J. acoust. Soc. Amer.
J. Allergy
J. Amer. Ass. colleg. Registr.
J. Amer. Ass. univ. Women
J. Amer. med. Ass.
J. Amer. statist. Ass.
J. Anim. Behav.
J. appl. Psychol.
J. Aviat. Med.
J. belge Neurol. Psychiat.
J. biol. Chem.
J. Biol. Med. exp., Moscou
J. cell. comp. Physiol.
J. chem. Educ.
J. clin. Invest.
J. comp. Neurol.
J. comp. Psychol.
J. consult. Psychol.
J. crim. Law Criminol.
J. crim. Psychopath.
J. Delinqu.
J. educ. Psychol.
J. educ. Res.
J. educ. Sociol.
J. except. Child
J. exp. Biol.
J. exp. Educ.
J. exp. Psychol.
J. exp. Zool.
J. Fish. Inst. Tokyo
J. gen. Physiol.
J. gen. Psychol.
J. genet. Psychol.
J. Hered.
J. higher Educ.
J. industr. Hyg.
J. juv. Res.
J. Laryng.
J. Mammal.
J. Mar. biol. Ass. U. K.
J. ment. Sci.
J. Mich. med. Soc.
J. Negro Educ.
J. nerv. ment. Dis.
J. Neurol. Psychiat.
J. Neurol. Psychopath.
J. Neurophysiol.
J. opt. Soc. Amer.
J. Organother.
J. Orn., Lpz.
J. Parapsychol.
J. Person. Res.

J. Pharmacol.
J. Phil (formerly J. Phil. Psychol. sci. Meth.)
J. Physiol.
J. Psychol.
J. Psychol. exp. path.
J. Psychol., Moscou
J. Psychol. Neurol., Lpz.
J. Psychol. norm. path.
J. R. anthrop. Inst.
J. sci. Instrum.
J. soc. Phil.
J. soc. Psychol.
J. Soc. psych. Res.
J. Speech Disorders
J. Wash. Acad. Sci.
Jap. J. appl. Psychol.
Jap. J. exp. Psychol.
Jap. J. Psychol.
Jb. Kinderheilk.
Jb. Philol.
Johns Hopk. Hosp. Bull.
Jugendk.

Kansas Teach.
Kentucky Person. Bull.
Kinderpsychiat.
Klin. Med.
Klin. Med., Mosk.
Klin. Wschr.
Kwart. psychol.

Lancet
Leica
Lyon chir.

Med. Ann. Dist. Columbia
Med. Klinik.
Med. leg. criminol. S. Paulo
Med. Rec., N. Y.
Med. Welt.
Medicina Arg.
Medicine, Baltimore
Mem. phys.-mat. Acad. Sci. Ukr.
Ment. Hyg., Lond.
Ment. Hyg., N. Y.
Ment. Meas. Monogr.
Metron
Mind
Misc. Publ. U. S. Dept. Agric.
Monist
Monogr. Soc. Res. Child Develpm.
Morph. Okol. Tiere
Mschr. Kinderheilk.
Mschr. KrimBiol.
Mschr. Ohrenheilk.
Mschr. Psychiat. Neurol.
Münch. med. Wschr.

Nat. Hist., N. Y.
Nature, Lond.
Nav. med. Bull., Wash.
Ned. Tijdschr. Geneesk.
Ned. Tijdschr. Psychol.
Nerv. ment. Dis. Monogr. Ser.
Neue psychol. Stud.
Neurobiologia
Neurobiologia, Pernambuco
N. Y. St. J. Med.
Nervenarzt
Nevrol. Psikhiatr.
Nevrol. Psychiat.
New Scholast.
Nov. refl. fiziol. nerv. Sist.

Occ. Pap. Bingham oceanogr. Coll.
Occup. Psychol.
Occup. Ther.
Occupations
Opportunity
Oversea Educ.

Pass. int. Clin. Terap.
Peabody Coll. Contr. Educ.
Peabody J. Educ.
Pediatrics
Penn St. Coll. Stud. Educ.
Person, J.
Pflüg, arch. ges. Physiol.
Phil. Rev., N. Y.
Phil. Sci.
Philos. Stud. (Wundt)
Philos. Trans.
Phys. Soc. Lond.
Physiol. Rev.
Physiol. Zoöl.
Polsk. Arch. Psychol.
Pop. Sci. Mon.
Pr. méd.
Prensa méd. argent.
Proc. Acad. Sci. Amst.
Proc. Amer. Ass. Stud. ment. Def.

Proc. Amer. phil. Soc.
Proc. Amer. sociol. Soc.
Proc. int. orn. Congr., VII, Amsterdam
Proc. interstate post-grad. med. Ass., N. Amer.
Proc. nat. Acad. Sci., Wash.
Proc. roy. Soc.
Proc. roy. Soc. Edinb.
Proc. roy. Soc. Med.
Proc. Soc. exp. Biol., N. Y.
Proc. Soc. psych. Res., Lond.
Psikhoterapiya
Psiquiat. Crim.
Psyche., Lond.
Psyche Schweiz. Mschr.
Psychiat. neurol. Bl., Amst.
Psychiat.-neurol. Wschr.
Psychiat. Quart.
Psychiatry
Psychoanal. Quart.
Psychoanal. Rev.
Psychobiology
Psychol. Abstr.
Psychol. Bull.
Psychol. Clin.
Psychol. Exch.
Psychol. Forsch.
Psychol. Index
Psychol. Monogr.
Psychol. Rec.
Psychol. Rev.
Psychol. Stud. Univ. Bp.
Psychol. u. Med.
Psychometrika
Psychometr. Monogr.
Psychosom. Med.
Psychother, Praxis
Publ. Univ. Calif. Educ., Phil., Psychol.
Publ. Hlth Bull., Wash.
Publ. Hlth Rep., Wash.
Publ. Opin. Quart.
Publ. Welf. Ind.

Quart. J. exp. Physiol.
Quart. J. Speech
Quart. J. Stud. Alcohol.
Quart. Rev. Biol.

Rass. Studi psichiat.
Refleksi, Instinkti, Naviki
Relig. Educ.
Rep. industr. Hlth Res. Bd., Lond.
Res. Publ. Ass. nerv. ment. Dis.
Res. Quart. Amer. phys. Educ. Ass.
Rep. aero. Rest Inst. Tokyo
Rev. Asoc. méd. argent.
Rev. Cienc., Lima
Rev. Circ. méd. Cent. estud. Méd.
Rev. Circ. milit.
Rev. Criminol., B. Aires
Rev. Espec. Assoc. med. argent.
Rev. Fac. Cienc. econ.
Rev. Filos
Rev. franc. Endocrin.
Rev. franc. Psychanal.
Rev. gén. Sci. pur. appl.
Rev. méd. lat.-amer.
Rev. neurol.
Rev. Neurol. Psychiat., Praha
Rev. Neurol. Psychiat. S. Paulo
Rev. Neurol. S. Paulo
Rev. Neuro-psiquiat.
Rev. Pedag.
Rev. Pedag., Tucuman
Rev. Phil., Paris
Rev. Psicol. Pedag.
Rev. Psiquiat. Crim., B. Aires
Rev. Psiquiat., Uruguay
Rev. sci., Paris
Rev. Soc. argent. Biol.
Riv. Patol. nerv. ment.
Riv. Psicol. norm. pat.
Riv. sper. Franiat.
Rocky Mtn Med. J.
Rorschach Res. Exch.
Roy. Air Force Quart.

S. Afr. J. med. Sci.
Safety Engng
Sch. Rev.
Sch. & Soc
Schr. Psychol. Berufseign.
Schweiz. Arch. Neurol. Psychiat.
Schweiz. med. Wschr.
Sci. Abstr.
Sci. Med. Rio de J.
Sci. Mon., Lond.
Sci. Mon., N. Y.
Science
Scientia, Milano
Scripta math.
Sem. méd., B. Aires

Sigma Xi Quart.
Skand. Arch. Physiol.
Smith Coll. Stud. soc. Work
Social Forces
Sociometry
Sovetsk. psikhonevr.
Spec. Rep. Ser. med. Res. Coun., Lond.
Stanford Univ. Publ. Educ.-Psychol.
Sth. med. J., Birmingham
Stud. Psychol. Psychiat. Cathol. Univ. Amer.
Stud. Yale psycholog. Lab.
Suppl. Educ. Monogr.
Surg. Gynec. Obstet.
Svenska Läkartidn.
Svenska LäSällsk. Handl.

Teach. Coll. Contr. Educ.
Teach. Coll. Rec.
Teach. Forum (Blind)
Tech. Rep. Hum. Engng Lab.
Theoria
Ther. d. Gegenw
Tidsskr. norske Laegeforen.
Tohoku psychol. Folia
Train. Sch. Bull.
Trained Nurse
Trans. Amer. neurol. Ass.
Trans. Amer. ophthal. Soc.
Trans. Amer. otol. Soc.
Trans. Amer. Soc. Mech. Engrs.
Trans. Coll. Phys. Philad.
Trans. Illum Engng Soc.
Trans. N. Y. Acad. Sci.
Trans. Opt. Soc., Lond.
Trans. Roy. Soc., Can.
Trans. zool. Soc., Lond.
Transit J.
Travail hum.
Tri-St. med. J.
Trib. Hebrea
Trud. Inst. Psikhonevr., Kiev.
Trus. ukr. psikhonevr. Inst.

Ugeskr. Laeg.
Ukr. Psikhonevrol. Akad.
Umschau
Univ. Calif. Publ. Physiol.
Univ. Calif. Publ. Psychol.
Univ. high Sch. J., Calif.
Univ. Hawaii Res. Publ.
Univ. Ia. Exten. Bull.
Univ. Ia. hum. Stud.
Univ. Ia. Stud. Aims Progr. Res.
Univ. Ia. Stud. Charact.
Univ. Ia. Stud. Child Welf.
Univ. Ia. Stud. Educ.
Univ. Ia. Stud. Psychol.
Univ. Ia. Stud. Psychol. Music
Univ. Ia. Stud. soc. Sci.
Univ. Minn. Bull. Emplyt Stab. Res. Inst.
Univ. Minn. Inst. Child Welf. Monogr.
Univ. Mo. Stud.
Univ. Ore. Publ.
Univ. So. Calif. Alumni Rev.
Untersuch. Psychol. Phil.
U. S. Child Bur. Publ.
U. S. Off. Educ. Bull.
U. S. Publ. Hlth Serv.
U. S. Veterans' Bur. med. Bull.

Valsalva
Verh. Akad. Wet., Amst.
Verh. int. orn. Kongr., V, Berlin
Vida neustra
Vyssh. Nerv. Deyat.

West J. Educ.
Wilson Bull.

Yale J. Biol. Med.
Yearb. Amer. psychol. Ass.
Yearb. nat. Soc. Stud. Educ.

Z. allg. Physiol.
Z. angew. Psychol.
Z. Arbeitspsychol.
Z. ärztl. Fortbild.
Z. Biol.
Z. ges. Neurol. Psychiat.
Z. Hals-Nas.- u. Ohrenheilk.
Z. Kinderforsch.
Z. Kinderheilk.
Z. Kinderpsychiat.
Z. Morph. Anthr.
Z. pädag. Psychol.
Z. Parapsychol.
Z. psychoanal. Pädag.
Z. Psychol.
Z. Psychother. med. Pyschol.
Z. Sinnesphysiol.

Z. Tierpsychol.	Zoologica, Stuttgart
Z. vergl. Physiol.	Zoologica, N. Y.
Zbl. ges. Neurol. Psychiat.	
Zbl. Psychother.	*Misc.*
Zh. Nevropat.	South = S.
Zool. Anz.	North = N.
Zool. Jb.	northern = north.
Zool. Jb. (Physiol.)	southern = south.

Rules for arranging the bibliography. The following rules for arranging a bibliography cover the more troublesome details. They include condensation of the more extensive rules for alphabetization found in the manuals, together with special rules covering articles and books for which there is no specific author, and which present particular problems. Present practice is to arrange the citations to known authors in a single alphabetical list followed by a secondary list of the references without specific authors. A sample bibliography (Exhibit III) which illustrates many of the points covered by these rules is found on page 371.

Items should be alphabetized by the surname of author (see examples in Exhibit III).

Enter an article by a married woman under the name which appears on the article to which reference is made.

Enter names beginning with M', Mc, Mac, or St., Ste, whether the following letter is capitalized or not, as if the prefix were spelled out in full as Mac or Saint, as in the following example: McClelland, MacDonald, Macfarlane, Magdsick, McGeoch, M'Intyre, H., McIntyre, J., MacIntyre, T., Mack, Mackay. This standard library practice arises because Mc is an abbreviation for Mac. It eliminates the confusion arising from not knowing whether a name begins with Mc or Mac. It also puts names of similar sound, such as MacMillan and McMillan together.

Enter compound names under the first part of the name as Friedsam-Korger, A., Rubin-Rabson, G., Watts-Dunton, T. (see 6 in Exhibit III).

Names with prefixes should be alphabetized as follows: In *English* alphabetize by the prefix: A. Becket, deCamp, de Silva, Van Alstyne. In *French*, *Italian*, *Spanish*, and *Portuguese*, enter under the prefix when it is an article, a preposition,* preposition and article combined into one word as: de Grazia, De Riot, de Rosny, Della Casa, Du Moncel, La Fontaine. If the prefix is a preposition and article that are separated, list under the article as: la Fayette, de. In *German* and *Dutch* list under the main name: Hindenburg, von; Noot, van der. When the prefix is compounded with the name, the name is treated as a single word as: Delacroix, Vanderhoeck, Vonhausen. Names in *German* spelled with an umlaut are listed as if the umlaut were spelled out, Müller as Mueller. In *Spanish* ch, ll, and rr are individual letters and are so treated.

The arrangement of a series of publications by the same author is as follows:

If an author has more than one publication over a span of years, the publications

* This departs from standard library practice, which distinguishes between De and de. However checking psychological bibliographies shows these have been treated alike for many years and placed under D.

should be arranged in the time order of their appearance (see 1, 2, 3 in Exhibit III).

If an author has more than one publication within a single year, the publications within that year are arranged alphabetically by title disregarding articles (see 1 and 2 in Exhibit III).

References to joint articles follow articles written by the senior author alone (see 4 in Exhibit III).

If reference is to an article or section prepared by a particular author, but published in a collection of articles such as a handbook or an annual review, entry is made under the particular author's name (see 5 and 9 in Exhibit III).

If reference is to an entire book, which is a collection of articles by various authors, entry is made under the name of the editor, if it is clear that he is responsible for assembling the material (see 7 in Exhibit III).

Anonymous articles are entered at the end of the list after the last alphabetical entry, with the title of the article coming first, followed by the abbreviation Anon., in brackets, thus [Anon.] (see 12 in Exhibit III).

Reports of committees, governmental organizations, etc., are grouped together at the end of the alphabetical list and are arranged alphabetically by title. The title is written first, followed by the name of committee or organization, then by the place, publisher, and year (see 13 and 14 in Exhibit III and items 13 to 22 in the Bibliography at the end of this article). In *Psychological Abstracts* and in library classifications, it is customary to alphabetize such reports under the subdivision responsible. But the rules are so lengthy and there are so many possibilities that can only be resolved in practice by professionals, that in bibliographies following articles, it seems best to depart from this practice, and accumulate such references at the end of the bibliography.* Unless the author has the complete rules available, he tends to get into difficulty, e.g., where does a report of a subcommittee on Planning of the Emergency Committee in Psychology of the Division of Anthropology and Psychology of the National Research Council go? There are four or five possibilities.

EXHIBIT III

A SAMPLE BIBLIOGRAPHY

1. Bills, A. G. The influence of muscular tension on the efficiency of mental work. *Amer. J. Psychol.*, 1927, **38**, 227–251.
2. Bills, A. G. Muscular tension and mental efficiency. *Indus. Psychol.*, 1927, **3**, 281–289.
3. Bills, A. G. Mental work. *Psychol. Bull.*, 1929, **26**, 499–527.
4. Bills, A. G., and Brown, C. The quantitative set. *J. exp. Psychol.*, 1929, **12**, 301–323.
5. Burks, Barbara S. The relative influence of nature and nurture upon mental development: a comparative study of foster parent-foster child resemblance and true parent-true child resemblance. Yearb. Nat. Soc. Stud. Educ., 1928, **27**(I), 219–316.
6. Chevaleva-Janovskaja, E. Les groupements spontânes d'enfants à l'âge préscolaire. *Arch. Psychol.*, Geneve, 1927, **20**, 219–233.
7. Cowdry, E. V. (Ed.) *Problems of ageing: biological and medical aspects.* (2nd Ed.) Baltimore: Williams and Wilkins, 1942.

* From now on the *Psychological Bulletin* will print such references at the end of the bibliography with titles in italics.

8. CRAFTS, L. W., SCHNEIRLA, T. C., ROBINSON, R. E., AND GILBERT, R. W. *Recent experiments in psychology.* New York: McGraw-Hill, 1938.
9. MILES, W. R. Psychological aspects of ageing. In E. V. Cowdry (Ed.), *Problems of ageing* (2nd Ed.). Baltimore: Williams and Wilkins, 1942. Pp. 756–784.
10. POMEROY, JULIA E. Reaction time of five-year-old children. Unpublished Master's thesis, Univ. Minn., 1936.
11. WHITEHEAD, T. N. *The industrial worker.* Cambridge: Harvard Univ. Press, 1938. Vol. I.
12. *Editorial.* [Anon.] *Manpower Rev.*, 1943, 10, 4–5.
13. *Juvenile Court Statistics (Year Ended Dec. 31) and Federal Juvenile Court Statistics (Year Ended June 30, 1935).* U. S. Dept. Lab., Child. Bur. Publ. No. 235.
14. *Psychology for the Fighting Man.* Committee of the National Research Council and Science Service, Washington, D. C. and New York: Infantry Journal, Penguin Books, 1943.

TYPING THE FINAL COPY

Spacing and page size. The final copy of an article should be typed double space on 8½ by 11 inch paper, with one-inch margins right and left, and top and bottom of the page, with a line length of approximately 6½ inches. If elite type is used, this is 78 spaces, and if pica (standard) type is used, this line length is 65 spaces. Typed in this fashion a page of text in elite runs approximately 330 words per page and page of text in pica type approximately 275 words per page, i.e., 3 pages of elite typing or 3.6 pages of pica (standard) type equals 1,000 words. While the number of words per page varies somewhat in the different psychological journals, because of variations in page size and type the number of printed words usually runs between 450 to 600 words per page. By using 500 words as a base, a rough estimate of the number of printed pages necessary can be obtained. Since 32 printed pages is the maximum articles should be or not over 16,000 words, i.e., 48 pages of elite or 58 pages of pica typing, including the bibliography which runs from 22 to 28 entries per page; if one divides the total number of entries by 25, a close approximation to the number of printed pages required will be obtained. The original copy of a typescript should always be furnished, not a carbon or a mineographed copy. The author should always *keep a duplicate copy of the paper for his own reference needs and as a protection against loss of the original in the mail or handling.*

Numbering pages and inserts. Pages should be numbered consecutively, including the pages containing the tables and the bibliography. Any change of pagination through insertion or omission must be indicated unmistakably. If it has been necessary to insert further pages after once numbering, the number of inserts should be clearly marked on the last regularly numbered page preceding the insert. For example, on page 25 say: "Insert 25a." Then number the inserted page 25a. *All inserts must be on full-size 8½ by 11 inch paper.* Brief inserts of a word or

two or of a sentence should be made on the margin of the copy. No fliers or parts of sheets should be glued, stapled, pinned or otherwise attached to the copy since they are so easily torn off and misplaced or lost.

Title and author. The title of the article should appear at the beginning of the first page, followed by the name of the author and the institution with which he is connected.

SPEECH AND PERSONALITY
FILMORE H. SANFORD
Harvard University

The ideal title is as brief as possible consonant with an adequate and precise description of the contents of the article. Titles that are too brief are likely to duplicate titles already used and cause confusion in bibliographies. Titles that are very long increase the expense of composition, create difficulties with running heads and add to the length and cost of every bibliography in which they are entered. In making running heads, it is convenient if titles contain not more than 45 letters. In any case, a title seldom should exceed 15 words. Particular care should be taken to select a distinctive title.

Headings. In typing headings care should be taken to distinguish between center headings for larger subdivisions and side headings, which are continuous with paragraph material (see page 351). It is highly desirable that headings be compact and that they have similar literary form for comparable sections of material. Following are examples of these three types of headings. The first can be indicated by centered typing in caps, the second by centered lower case underlined, and the third by underlining the appropriate word or phrase and running on.

(centered main head)
PRESSURE-VIBRATION SPOTS UNDERLYING TISSUES
(centered subsidiary heads)
Vibratory Sensitivity and Skin Temperatures
(side minor heads)

Intelligence. The modern literature shows that measurements of intelligence. . . .

Smaller type. In some articles there are quoted passages, secondary material and explanatory detail which can be set in smaller type, thus saving space and improving the readability of the article. While formerly it was customary to type such material single space, modern practice is to use double spacing and to indicate such sections by drawing a light pencil line in the left-hand margin of the copy showing the extent of such sections and writing "smaller type" along the line. If material is typed single space typesetting becomes more difficult and more errors

are made. If possible, sections to go in smaller type should begin on a new line.

Footnotes. One method of typing footnotes is to place them in the body of the text or at the bottom of the page on which the reference occurs but separated from the text by lines running across the page. The other method is to cumulate footnotes on separates pages at the end of the article. Either method may be used provided the copy is clear. But footnotes should never be run into the body of the text in parenthesis or otherwise, and should be typed *double space*, not single space.

Cuts and tables should be indicated by a clear break in the typing, set off by enclosing lines as follows:

Insert Figure 1 about here

Tables should be typed on separate pages.

Bibliography. The bibliography should be typed double space with an indentation of three spaces for the second line of the reference, as in Exhibit III. Authors' names should be in capitals, followed by the title of the paper, journal (abbreviated from our list of forms for citations or from the *World List* and underlined once), year, volume (in Arabic numerals), initial and final pages (see examples in Exhibit III). For books, the authors' names should likewise be in capitals, followed by the title (edition, if any, see example 7 in Exhibit III), place of publication, publisher and date of publication. In typing authors' names if the author is a man, only the initials are given for the first names; if the author is a woman, the first name is spelled out (compare 1 with 5 in Exhibit III).

Only the initial letter of the first word of a title of an article or book, except in the case of proper names, should be capitalized (see Exhibit III). When there are two or more authors, the conjunction is indicated by the ampersand rather than by the word "and" (see 8 in Exhibit III). When only one volume of a book of more than one volume is cited, the volume number is placed after the date of publication (see 11 in Exhibit III). With Yearbooks published in two parts, parts are indicated by a Roman numeral in parenthesis after the volume number, as in 5 in Exhibit III). Finally, when an unpublished thesis is referred to, it is cited as in 10 in Exhibit III.

Conclusion

The purpose of this paper is two-fold: first, to assist authors in the preparation of suitable manuscripts from the standpoint of the technical

requirements for publication and, second, to free the editor from making routine corrections of author's manuscript. Careless, slovenly, poorly organized and typed manuscripts are difficult and expensive to handle. Within recent years there has been great improvement in the makeup of the manuscripts submitted to psychological journals. This trend is a definite encouragement to those among us who have been concerned with the problem for many years. It is our present purpose in producing this more elaborate guide to help the members of our profession to become sensitized to the practices that make for good preparation of manuscripts and to gain skill in their use. Research is not finished when the last datum is analyzed. There still remains the effective communication of the methods of research and the results obtained to those competent to make use of them. The mastery of skills involved in attaining this end is a worth while professional accomplishment.

Finally, we hope that those who direct the work of graduate students will constantly hold these standards before them.

BIBLIOGRAPHY

1. ALLPORT, G. W. The Journal of Abnormal and Social Psychology: An editorial. *J. abnorm. soc. Psychol.*, 1938, **33**, 3–13.
2. ARKIN, H. & COTTON, R. *Graphs: How to make and use them.* (2nd Ed.) New York: Harper, 1938.
3. ANDERSON, J. E. The preparation of book reviews. *Psychol. Bull.*, 1943, **40**, 423–426.
4. BALL, ALICE M. *Compounding in the English language.* New York: H. W. Wilson Co., 1939.
5. BRUNER, KATHERINE F. Of psychological writing: being some valedictory remarks on style. *J. abnorm. soc. Psychol.*, 1942, **37**, 52–70.
6. BRINTON, W. C. *Graphic presentation.* New York: Brinton Associates, 1939.
7. DUNLAP, J. W. & KURTZ, A. K. *Handbook of statistical monographs, tables, and formulas.* Yonkers-on-Hudson, New York: World Book Co., 1932.
8. HASKELL, A. C. *How to make and use graphic charts.* New York: Codex Book Co., 1919.
9. MCCALL, W. A. *How to measure in education.* New York: Macmillan, 1922.
10. MCGEOCH, J. Forms of citation adopted by the Board of Editors of the American Psychological Association. *Psychol. Bull.*, 1939, **36**, 25–30.
11. WALKER, HELEN M. *Elementary statistical methods.* New York: Henry Holt, 1943.
12. WILLIAMS, J. H. *Graphic methods in education.* Boston: Houghton, Mifflin, 1924.
13. *Catalog rules: author and title entries.* Compiled by Committees of the American Library Association and the (British) Library Association. Chicago: American Library Association, 1908. Pp. 88.
14. *Directory of periodicals. Psychol. Abstr.*, 1929, **3**, 724–73.
15. *Engineering and scientific graphs for publication. American standard, 1943.* Prepared by the Committee on Standards for Graphic Representation, American Standards Association. New York: Amer. Soc. Mech. Engineers, 29 West 39th St. Pp. 27.
16. *Instructions in regard to preparation of manuscripts.* Prepared by a committee of the Conference of Editors and Business Managers of Anthropological and Psychological Journals (Madison Bentley, Chairman). *Psychol. Bull.*, 1929, **26**, 57–63.

17. *Key to periodical abbreviations. Psychol. Abstr.*, 1941, **15**, 641–649.
18. *A manual of style* (10th Ed.) Chicago: Univ. of Chicago Press, 1937.
19. *A style book containing suggestions for the preparation of manuscripts. J. Neurophysiol.*, 1939, **2**, 89–99.
20. *Suggestions on writing a thesis.* Dept. of Psychology, Northwestern University. (Mimeo.)
21. *Time-series charts: a manual of design and construction. American standard, 1938.* Prepared by the Committee on Standards for Graphic Representation, American Standards Association. New York: Amer. Soc. Mech. Engineers, 29 West 39th St. Pp. 58.
22. *A world list of scientific periodicals published in the years 1900–1933* (2nd Ed.). London: Oxford Univ. Press, 1934.

PSYCHOLOGICAL DISORDERS RESULTING FROM ELECTRICAL SHOCK

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A survey of the literature on the psychological aspects of conditions resulting from electrical shock reveals many articles in the medical journals, a large part of them in foreign periodicals, but relatively few in psychological journals. The effects of electrical shock are many and varied, and the writers are often in disagreement. Among the immediate effects described are unconsciousness, muscular spasm, ruptures and fractures from the spasms, convulsions, temporary paralysis, dilation of the heart, increase of the cerebrospinal fluid or cerebral edema, and burns. Following the shock there may be such symptoms as headache, confusion, sensory and motor disturbances of various kinds such as deafness, loss of taste, etc., gangrene, convulsions of epileptic nature, and albuminuria. Late and lasting effects which have been reported are ocular disorders such as cataract, strabismus, and even disturbances in color vision; hearing disabilities; affections of the nervous system such as paralyses, disseminated sclerosis, the Parkinsonian syndrome, hemiplegia, and aphasia; epilepsy; and various disturbances of a psychological nature. It is with the last named that this paper is primarily concerned.

In American medical articles little interest is evinced in the matter of psychic disturbances following electrical shock. The fact that such cases have been reported is mentioned, and little more is said. Most of the cases have been in European journals. It is difficult to determine how frequently such cases occur.

Jaffé (9), Alexander (2), Critchley (3), Langworthy (11) and other writers in the field are agreed that neurological sequellae are rare, that in most cases of electrical shock recovery is rapid and complete. However, it appears likely that the percentage of cases with late mental disorders may be somewhat larger than a study of the medical journals would lead one to believe. If mental disturbances are not severe, they probably never come to the attention of the physician. Then, too, the average physician who has his attention directed to other aspects of the case is apt to overlook or minimize the importance of psychological disorders. Many tend to be sceptical and unwilling to commit themselves on such a subject.

Pearl (16) says, "Especially when psychic disturbances are concerned, one is tempted to brand such patients as malingerers or hysteroneurotic persons. It is often difficult to judge how much is due to the effect of the current on the body and how much to an attempt on the part of the patient to obtain pro-

longed compensation. The current is an agent which may produce profound functional changes in the central nervous system, and thus offer difficulty in properly evaluating symptoms which might be ascribed to it." Jaffé (9) writes, "As in other types of accidents, electric currents have been blamed for a large number of functional disturbances." Langworthy and Kouwenhoven (13), in speaking of instability of the nervous system following shocks, says, "How much of this is due to actual damage of the nerve cells and how much should be classed as a neurosis it is difficult to say. Unfortunately the question of compensation often enters as an important factor." In another article (11) Langworthy writes, "Compensation neuroses are common."

Most of the articles on injuries from electric shock do not mention psychotic disorders following the shock. Some of the writers have noted briefly that various neurotic and psychotic disturbances do occasionally follow shock.

Valega (18) speaks of mental disorders which have been noted, such as compensatory neurosis and more or less serious psychotic conditions. Macfarlan (14) writes, "Neurosis and 'nervous shock' are obtaining a more serious consideration than was heretofore given them. True there is still the occasional malingerer, but more often than not these manifestations are actual symptoms, not feigned, not hysterical." Jaffé (9) comments, "There are also observations on change of character, loss of memory, loss of sexual function, etc." Langworthy and Kouwenhoven (13) say, "Many individuals show an instability of the nervous system for a considerable time." They refer to Panse (15) who examined 21 individuals injured by lightning discharges, almost all of whom were unconscious for a short time following the shock, and found functional disturbances varying from sleeplessness on the first night after the accident to rather severe psychotic manifestations. Critchley (3) says, "States of mental aberration with delirium and hallucinations have been described as developing some months after electric shocks; but it is difficult to be sure of any direct association in the cases on record," and (4) "In addition to the hysterical disorders appearing immediately after the accident, various psychoses may develop after an interval." Pearl (16) states, "Other late sequellae may involve the nervous system. There may be marked disturbances of the psyche, with feelings of inferiority and impending disaster, insomnia, amnesia, defects in concentration, loss of sexual power, and psychoneurotic syndromes such as are seen after cerebral concussion."

Just what happens to the body during a flow of current? Material is not lacking upon this subject, and the answer to the question may throw some light on the cause of late psychological disorders and suggest the types of disorders to be expected. There have been three sources of data:

a. experimental studies of the bodies of laboratory animals subjected to shock;
b. histological studies of bodies of the criminally electrocuted;
c. examination of persons killed in industrial electrical accidents.

The types of injury following contact with electrical current are legion. They range from simple local burns of the skin to deep charring

and widespread necrosis involving any tissue (8). The skin offers the highest resistance to the current and blood offers the least resistance. When the skin resistance is lowered due to sweating or wet skin at points of contact, the current enters the body more easily, burns are slight or absent, and internal damage to tissues is greater. The blood is the best conductor and most of the current passes along the blood vessels. The nervous tissue offers fairly high resistance to the current but its resistance is considerably lower than that of the skin and bones. It seems logical that the tissues offering highest resistance would be injured by the heat and that those tissues with low resistance would be primarily affected by the current.

Since the current follows the path of least resistance, once in the body it affects primarily the vascular system. Next in frequency, as noted, are lesions in the central nervous system. Even though the nervous system may not be injured directly, it is affected indirectly by vascular hemorrhages in the brain and cord. These capillary hemorrhages in the nervous system and throughout the body are revealed in microscopic examinations (13).

Critchley (4) is of the opinion that, "Some of the diffuse and isolated cerebral sequellae, as well as some of the psychological after-effects, may be the result of cerebral vascular lesions, single or multiple." Hesser (8) states, "Due to progression of blood vessel or nerve impairment, late disorders of structure and function occasionally develop from the original injury." Langworthy and Kouwenhoven (12) found hemorrhages in the central nervous systems of shocked rats, and Langworthy (10) produced cavities and necrosis of tissue in the spinal cords of rats by electric current. Macfarlan (14) speaks of the mechanical trauma: "The fact that many of the victims of the shock are forcibly hurled down and knocked unconscious must make one mindful of the possibility of cranial injuries, concussion, basal or spinal fracture. Such damage might easily be overlooked." Hassin (7) takes this rather unique view of injuries: "The electric current affects directly the brain tissues and their blood vessels causing a severe jarring or a commotion similar to that sustained in a fall, or in a fast moving train, a phenomenon which may be classified as concussion of the brain."

What kinds of psychological disorders would one expect to find on the basis of such physical injuries, and how are observed cases explained by the injuries? Since the intensity, extent, and localization of lesions resulting from electrical injuries are varied, we might expect to find a considerable variety of disorders. The cases on record are indeed of considerable variety. However, it is possible to make a crude classification of them, as follows:

1. post-concussional syndromes
2. precipitations of latent processes
3. post-encephalitic symptomatologies

1. The finding of post-concussional syndromes substantiates Hassin's (7) view of injuries as given above.

Pearl (16) mentioned that psychoneurotic syndromes such as those seen after cerebral concussion may appear as late sequellae in electrical shock cases. In his outline of neurological complications, Critchley (3) places post-concussional syndromes under psychological disorders. He says, "Post-concussional syndromes are particularly common after severe burns of the scalp, with or without damage of the skull. The usual symptoms consist in headaches, vertigo, nervousness, defective memory, and insomnia, commencing typically some weeks after the injury."

2. Langworthy (11) has said that a severe electric shock may precipitate a psychosis. Hysterical reactions to shock are undoubtedly indicative of a previous tendency toward hysteria and are not the result of some physical change. However, care should be exercised in diagnosing hysteria in electrical shock cases. There is likely to be, in many cases, a real cause for complaint.

Critchley (4) has had the most to say about this type of psychological disorder: "Hysterical manifestations are very common, especially after lightning stroke. Very many cases are on record of blindness, deafness, and loss of speech in the victims of lightning stroke. With electrical accidents paralysis is the common hysterical sequel, and elsewhere I have described the case of a man who fell across the line of an underground railway and immediately became paralyzed although no current was flowing at the time. Hysterical amnesia and states of dissociation are also known."

Schiff, Pichard, and Pouffary (17) present a case which illustrates how electric shock may precipitate latent disorders.

An alcoholic patient, who had previously shown no mental disturbances, was shocked and thereafter had unsystematized visual, auditory, kinesthetic, and psychosomotor hallucinations. This was an atypical chronic hallucinatory delirium with a predominance of incessant motor over activity. There was a first amelioration, after which a complete recovery followed the cessation of alcoholic habits.

The authors think that the electrical discharge affected most particularly the cellular zones touched by alcohol and formed at this level a cerebral meiopragia (decreased functional activity), after which alcoholic excess provoked a veritable prolonged delirium tremens.

Into this classification, precipitations of weaknesses, would probably go also the functional psychoses following shock. Again caution should be used. To say that shocks precipitate weaknesses, unless there have been some previous signs of the weaknesses, is an easy and meaningless explanation, equivalent to saying that the cause of an ailment is a constitutional tendency toward the ailment.

3. Many observers have reported cases presenting symptoms quite like those following encephalitis. Fetterman and Smiley (5) presented such a case and attempted an hypothesis, which seems plausible and which explains the symptomatologies in many cases. They believe that general symptoms such as those found in post-encephalitic cases may

result from brain trauma, whether it is produced by electricity, direct mechanical violence, or infection. The effect of brain trauma is essentially the breaking down of cortical control. The age of the patient is the most important factor in the type of manifestation. They elaborate thus:

In the functioning of the adult mind, efficiency depends on selectivity of stimuli and reactions. Not all stimuli should be reacted to; not all sensations should receive one's attention. With growing years there develops a cortical control serving the function of inhibiting unnecessary reflexes. . . . Once this inhibiting function is acquired, it may be diminished or destroyed by certain major damage to the brain. The outstanding disease process that affects this function is encephalitis. Post-encephalitic children are characterized by distractability and hyperkinesis. Recently a similar clinical picture has been drawn for children who have sustained severe cranial injury. One may wonder why a hyperkinetic disorder occurs in youth and not in adults. With traumatic damage in older persons we have frequently seen depressed states or paranoid reactions. When the cortex has been damaged by a virus, mechanical or vascular change, the impairment affects the most difficult function. In the youngster, it impairs his ability to concentrate. In the adult his ability to look outward, to study reality is affected. Thoughts are more quickly introverted; the outer environment is less easily understood. In the face of physical difficulties and a misunderstood environment there is a tendency toward worry and suspicion, all of which leads to a depressed or paranoid reaction.

Fremming (6) also reported a child's case.

A child received a shock from high voltage wires. The physical symptoms soon cleared up, but thereafter, the child showed an extreme alteration of personality, with symptoms closely resembling those following encephalitis lethargica.

General instances of paranoid delusions and intellectual impairment have been described in cases of shocked adults.

Macfarlan (14) in writing of consequences of electrical shock says, "Mental inertia and amnesia are commonly seen. The symptoms resemble war neuroses or post-encephalitis in the characteristic timidity, fear, uncertainty, lack of memory, and inability to concentrate." The following case of Alexander's (1) shows a post-encephalitic picture. A 34-year-old street car motorman was shocked by a 600-volt alternating current and fell down unconscious, immediately developing myoclonic convulsions in his face. When he regained consciousness twelve hours later he was drowsy, incompletely oriented, and at times delirious and excited. The myoclonic convulsions of the face persisted. In the following year he gradually developed tremor at rest, and rigidity and loss of associated movements of the right hand and arm. During this same time the mental changes became more definite and finally remained stationary; he showed decrease of spontaneity, mental dullness, slowness, unproductivity, disturbance of memory for recent events, stereotyped uniformity, tendency to iterations and perseverations, cataleptic behavior, difficulty in finding words, disturbance of acoustic attention, paranoid delusions and tactile hallucinations. The picture remained essentially unaltered for a period of three years, during which he was observed at frequent intervals.

SUMMARY

The effects of electrical shocks are many and varied. Most of the writers in the field are agreed that neurological sequellae are rare, but they may be more frequent than a study of the medical journals would lead one to believe. The chief change in bodily tissues which might lead to subsequent psychological disorders is the occurrence of capillary hemorrhages in the central nervous system. The mental disorders resulting are of three types: post-concussional syndromes, precipitations of latent processes, and post-encephalitic symptomatologies. The last seem most frequent. Post-encephalitic symptomatologies in children are different from those in adults. Typical of children are hyperkinesis and inability to concentrate; adults tend to become introverted and to develop ideas of persecution.

As electrical shock cases are comparatively rare and as these cases have for the most part been studied from the medical point of view, there has been a tendency for psychological disorders resulting from shock to be passed over lightly. However, the increasing frequency of electrical accidents is leading to a greater interest in all aspects of such cases. The psychiatrist is best equipped to deal with the victims of psychological changes resulting from electrical shock. Probably in the future shock cases will more and more be referred to qualified experts. A more careful follow-up of electrical injury cases might well reveal additional evidence of mental and personality disturbances resulting from the injuries. Certainly the psychological aspects of the problem deserve more attention and are worth further investigation.

BIBLIOGRAPHY

1. ALEXANDER, L. Clinical and neuropathological aspects of electrical injuries. *J. Industr. Hyg. and Tox.*, 1938, **20**, 191–243.
2. ALEXANDER, L. Electrical injuries to the central nervous system—clinic. *Med. Clin. N. Amer.*, 1938, **22**, 663–688.
3. CRITCHLEY, M. Industrial electrical accidents in their neurological aspect. *J. of State Med.*, 1932, **40**, 459–470.
4. CRITCHLEY, M. Neurological effects of lightning and electricity. *Lancet*, 1934, **68**, 1, 68–72.
5. FETTERMAN, J. L., & SMILEY, R. E. Electrical damage to the brain. *J. Amer. Med. Ass.*, 1937, **108**, 1390–1392.
6. FREMMING, K. H. Beschadigungen des Zentralnervensystems als Folge elektrischer Verletzungen; mit besonderer Beruckstigung dauernder Folgerscheinungen bei Kindern. *Z. Kinderpsychiat.*, 1940, **7**, 97–102.
7. HASSIN, B. Electrocution. *J. nerv. ment. Dis.*, 1937, **86**, 668–673.
8. HESSER, F. J. Result of contact with 2400 volt circuit. *Johns Hopk. Hosp. Bull.*, 1941, **68**, 611–617.
9. JAFFÉ, R. H. Electopathology. *Arch. Path.*, 1928, **5**, 837–870.
10. LANGWORTHY, O. R. Necrosis of the spinal cord produced by electrical injuries. *Johns Hopk. Hosp. Bull.*, 1932, **51**, 210.

11. LANGWORTHY, O. R. Neurological abnormalities produced by electricity. *J. nerv. ment. Dis.*, 1936, **84**, 13–26.
12. LANGWORTHY, O. R., & KOUWENHOVEN, W. B. An experimental study of abnormalities produced in the organism by electricity. *J. industr. Hyg.*, 1930, **12**, 31.
13. LANGWORTHY, O. R., & KOUWENHOVEN, W. B. Injuries produced by contact with electrical circuits. *Amer. J. Hyg.*, 1932, **16**, 625–666.
14. MACFARLAN, D. Electrical shocks; causes, incidences and consequences. *Arch. phys. Ther.*, 1937, **18**, 99–102.
15. PANSE, F. Über Schadigungen des Nervensystems durch Blitzschlag. *Mschr. Psychiat. Neurol.*, 1925, **59**, 323.
16. PEARL, F. L. Electric shock, presentation of cases and review of the literature. *Arch. Surg., Chicago*, 1933, **27**, 227–249.
17. SCHIFF, P., PICHARD, J., & POUFFARY, C. Psychose hallucinatoire chronique et electrocution. *Encephale*, 1928, **23**, 46–50. (*Psychol. Abstr.*, 1928, **2**, 2810.)
18. VALEGA, J. F. Efectos neuro-psiquicas del trauma electrico. *Rev. Neuropsiquiat.*, 1939, **2**, 362–372. (*Psychol. Abstr.*, 1940, **14**, 3042.)

NOTICE

PRELIMINARY ANNOUNCEMENT: THE FIFTY-SECOND ANNUAL MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION, HOTEL STATLER, CLEVELAND, OHIO, SEPTEMBER 11 & 12, 1944

To Associates and Members of the American Psychological Association:

The American Psychological Association, by resolution of the Council of Directors, will meet at Cleveland, Ohio, on Monday and Tuesday, September 11 and 12, 1944, in conjunction with the meetings of the American Association for the Advancement of Science. The headquarters will be at the Hotel Statler. The plan for the meeting has been developed by the Program Committee in cooperation with the American Association for Applied Psychology and Section I of the AAAS. The Council of Directors and Program Committee have voted not to issue the usual Call for Papers because of war-time restrictions.

The sessions will stress the contributions of psychology to the war and problems of the post-war period. Invited participants will present a program on psychology and the war on Monday morning and a similar program on post-war problems will be held on Tuesday morning. A session on Monday morning will be concerned with the graduate and professional training of psychologists. Monday afternoon will be devoted to a discussion of the proposed reorganization of psychological societies. Time has been reserved during the same afternoon for business meetings of affiliated societies. Tuesday afternoon, September 12, has been reserved for the annual business meeting of the AAAP and the APA, one following the other. Plans for presidential addresses and a dinner are still under discussion at this writing.

A more detailed program will be printed in the July issue of the *Bulletin* and additional information will be mailed at a later date to each Associate and Member.

This notice has been issued by the Secretary on behalf of the Program Committee consisting of Harold Burtt, *Chairman*, Dael Wolfle, and the Secretary, and of the Executive Committee consisting of Gardner Murphy, *President*, Calvin S. Hall, *Cleveland representative*, and the Secretary.

WILLARD C. OLSON, *Secretary*

PSYCHOLOGY AND THE WAR

Edited by
DONALD G. MARQUIS

CONTENTS

THE AVIATION CADET QUALIFYING EXAMINATION OF THE ARMY AIR FORCES

STAFF OF THE PSYCHOLOGICAL BRANCH,
OFFICE OF THE AIR SURGEON
Headquarters Army Air Forces,
Washington, D. C.

This article is the fifth in a series describing the Aviation Psychology Program of the Army Air Forces. Previous articles have dealt with the general program (2), and with the functions and research activities of the Psychological Research Units prior to June 30, 1943 (3, 4, 5).

The development of a test that would be suitable for initial selection of men for training as pilots, bombardiers and navigators, and construction and experimental tryout of successive forms of this Aviation Cadet Qualifying Examination was a function of the Psychological Branch, Research Division, Office of the Air Surgeon, Headquarters Army Air Forces, from the fall of 1941 through the early part of the summer of 1943. As of June 30, 1943 the following officers were on duty in the Psychological Branch: Lt. Col. John C. Flanagan, Major (now Lt. Col.) Paul Horst, Capt. (now Major) Paul M. Fitts, Jr., Capt. Robert L. Thorndike, Capt. Frederick B. Davis, Capt. Chester W. Harris, and Lt. William G. Mollenkopf. In addition, the following civilians were serving in a professional capacity: Dr. William O. Jenkins, Mrs. Virginia F. Sheffield, Dr. Mary B. Willis, Mrs. Dorothy Bechtoldt, Mr. William J. McCabe, and Miss Margaret Mitchell. In addition to this specific work in test construction, this staff had general responsibility for policies and procedures for the selection and classification of aircrew personnel. The functions of this office included coordination of research activities in the Aviation Psychology Program, maintenance of liaison with organiza-

tions working on related problems, approval of all psychological selection and classification tests and procedures, and related administrative activities. In August 1943, the function of constructing the Aviation Cadet Qualifying Examination was transferred to the Office of the Surgeon, AAF Training Command, and those members of the staff that had been working on the test were moved to PRU No. 3 where development of the Qualifying Examination could be coordinated with the development of tests of intelligence and judgment in the classification test battery. The remainder of this article deals with the historical development, construction, validation, and revision of the Aviation Cadet Qualifying Examination.

Historical Development of the First Form of the Aviation Cadet Qualifying Examination

The Aviation Cadet Qualifying Examination has been administered to more than a million American men. This examination differs from most other widely used tests in that it has always been primarily a power test administered under a three-hour time limit. Three other important characteristics should be noted concerning the Qualifying Examination: first, it is administered to civilians as well as to Army personnel when they first apply for aviation cadet training; second, applicants for cadet training who fail to pass may take different forms of the examination as many times as they wish, provided only that at least thirty days elapse between each testing; third, the content of the examination has been modified in successive forms in the light of its efficiency in predicting a stated criterion.

Fifteen forms of the Qualifying Examination have already been written and prepared for publication to April 1944. All of the 2,610 items in these forms have been selected from experimental test materials constructed especially for this purpose. The selection of individual items for the final forms of the examination depends on many considerations. Among the prime considerations are item difficulty and item correlation with the criterion. In constructing recent forms of the examination it has been the policy to use, so far as possible, only individual items known to have significant positive correlations with the criterion of graduation or elimination from pilot training.

The development of the Qualifying Examination reflects the fact that pilots, bombardiers, and navigators of the Army Air Forces have always been selected with great care. High physical standards have been set and are still maintained. The requirements of formal education were strict prior to January 1942, when the Aviation Cadet Qualifying Examination was first put into use. From 1927 until January 1942, a man could qualify for aviation cadet training as a pilot only if he had

successfully completed at least two years of college work or had passed a written examination covering several basic college subjects. As the number of men required for training as pilots, bombardiers, and navigators increased by leaps and bounds after the outbreak of war in Europe in 1939, and particularly after the summer of 1940, it became evident that not enough college-trained men could be obtained. For this and other reasons, late in 1941 men with high-school education were accepted for enlistment for bombardier and navigator training if they could meet a certain minimum standard on a battery of three tests, the Army General Classification Test, the Army Mechanical Aptitude Test, and a physics test.

It soon became apparent that the demand for pilots could not be met exclusively from the ranks of college-trained men, so in November 1941 representatives of the Military Personnel Division, the Training and Operations Division, and the Office of the Air Surgeon recommended that a single aptitude test for selecting all aviation cadets be prepared and that responsibility for its development and continuing improvement be assigned to the Office of the Air Surgeon. A directive to this effect was signed on December 20, 1941 by General Stratemeyer, then Assistant Chief of the Air Corps.

A psychological research agency had already been established in the Medical Division of the Air Corps during the early summer of 1941. To this agency, now the Psychological Branch, Research Division, Office of the Air Surgeon, was assigned immediate responsibility for the Aviation Cadet Qualifying Examination.

At the request of the Air Surgeon the Chief of the Psychological Branch prepared a tentative outline for this examination early in November and the staff began writing items for the first form. Preliminary approval of the plans for this examination was obtained from representatives of the Training and Personnel Divisions and later the outline for the test and a number of specimen items were presented by the Chief of the Psychological Branch at a conference of representatives of various interested War Department groups presided over by General Cousins, then Assistant Chief of the Air Staff for Personnel.

Two features of this test were stressed in this presentation, first, the practical character of the various sections. For example, the reading and mechanical comprehension sections were based on materials taken from Army Technical Manuals and training texts. Similarly, the words for the vocabulary section were all taken from typical training materials and the mathematics questions were concerned with skills essential to successful work in training courses. The practical nature of the items on judgment and aviation was also pointed out.

The second feature which was stressed was that instead of providing

an artificial situation in which the principal emphasis was placed on how rapidly questions such as these could be answered, the test was intended to provide a more natural work situation in which the individual proceeded at his own pace and took as much time as he found necessary to complete the items. Thus, instead of a typical psychological test for intelligence or a conventional educational test of academic achievement, a test of the individual's practical proficiency in doing the types of tasks which would be required of him in the Air Force training schools was to be developed.

These plans for the examination were approved and the staff proceeded to construct the items for the first form of the Aviation Cadet Qualifying Examination, Test AC10A.* After the items had been written, a conference was called by the Chief of the Psychological Branch on December 18 and 19, 1941 to edit and revise the materials prepared for this initial form. A number of professional experts in the field of test construction were invited to attend.†

The following general principles were presented for the guidance of the conferees in evaluating the outline and items for the test:

1. The examination was to be used for the initial selection of navigators and bombardiers as well as of pilots.
2. The examination was to take the place of the requirement of formal education for selecting men of officer quality.
3. The examination would probably make its greatest contribution to the extent to which it predicted graduation or elimination from pilot training schools, since the number of pilots in training is always greater than the number of bombardiers and navigators in training.
4. The examination was to be administered in hundreds of Aviation Cadet Examining Boards scattered throughout the continental United States and in Army bases overseas by men with no professional psychological training. This required that the materials used for the examination and the directions for administering and scoring it be as simple as possible.

The test items were carefully edited by the conferees and the general plan to include the sections listed below with the numbers of items indicated was approved.

Part I. General Vocabulary: 45 items
Part II. Reading Comprehension: 15 items
Part III. Practical Judgment: 15 items
Part IV. Mathematics: 30 items

* The staff of the Psychological Branch at that time included Major John C. Flanagan, two professional civilian employees, Dr. Paul M. Fitts and Mr. William J. Carnahan and three assistants with some professional training in psychology and test construction, Miss Margaret M. Mitchell, Mrs. Hermione Hawkins, and Mrs. Constance Moerman.

† The civilian consultants were: Dr. George K. Bennett, Dr. Frederick B. Davis, Dr. Truman L. Kelley, Mr. Charles R. Langmuir, Dr. Irving D. Lorge, and Dr. Neal E. Miller.

Part V. Current Events in Aviation and the War: 30 items
Part VI. Mechanical Comprehension: 15 items

Examples of the items in the various parts of Test AC10A are shown in a previously published article (1).

Before Test AC10A was released for use, it was submitted by the Chief of the Psychological Branch to a special board appointed by the Commanding General of the Army Air Forces. This board, composed of Major General Walter R. Weaver, Major General Ralph P. Cousins, Brigadier General Walter F. Kraus, and Brigadier General Luther S. Smith, met with Colonel Harris Jones, Dr. Jerome Hunsaker of the Massachusetts Institute of Technology, and Dr. Walter V. Bingham of the Personnel Procedures Section of the Adjutant General's Office. After the examination had been approved by this board, it was immediately put into official use on January 15, 1942 in Aviation Cadet Examining Boards throughout the continental United States and its possessions and overseas bases.

Refinement of the Aviation Cadet Qualifying Examination

Preliminary data concerning the difficulty of Test AC10A suggested that if the minimum score for passing the examination were set at 90,* the number of men required for aircrew training could be secured and the standards would exclude the weakest fifteen or twenty percent of those who had been qualifying under the old two-year college requirement. This passing mark set a fairly high standard for qualification, but it proved in practice to be satisfactory. Passing marks for subsequent forms of the examination have been empirically determined relative to the passing mark on Test AC10A. The standard score on the Army General Classification Test equivalent to a score of 90 on Test AC10A was found to be approximately 119. The correlation between Test AC10A and the Army General Classification Test was .64 in a sample of 282 aviation cadets. More recent forms of the Aviation Cadet Qualifying Examination, Tests AC12I and AC12J, have been found in three samples of approximately 1,000 unclassified aviation students to have correlations of .44 to .47 with the General Classification Test. Since the reliability coefficients of both tests are high, it is clear that the tests are measuring rather different abilities.

As soon as Test AC10A became available in published form, the first of a series of studies designed to increase the efficiency of the examination as a selective device was begun. Since the directive governing the

* The score on this examination was the number of items marked correctly plus one-fifth of the number of items deliberately omitted by the applicant. This scoring formula made it inadvisable for an applicant to indulge in sheer guessing.

selection of aviation cadets specifies that applicants for cadet training who fail to pass the examination may take it again, it is obvious that new forms of the Qualifying Examination must be released periodically for use in the Aviation Cadet Examining Boards. To improve successive forms of the examination, extensive research has been carried on by the staff assigned to the development of the Qualifying Examination and the results of this research have been immediately put into practical use to improve the procedures for selecting aviation cadets.

The basic procedure for research studies of this type is to correlate several sets of test scores with the criterion and with each other and to calculate the weighting of each set of test scores that will yield the best multiple correlation with the criterion. In some circumstances this is a straightforward procedure, but in the case of the Aviation Cadet Qualifying Examination many practical considerations complicate the matter. It is clear that the most fundamental criterion for selecting pilots, bombardiers, and navigators is success in combat with the enemy, but for several reasons this criterion has not yet been used for studies of the efficiency of the Qualifying Examination. First, many months elapse between the time an applicant for aviation cadet training is tested in an Aviation Cadet Examining Board and the time he enters into combat. Second, it is exceedingly difficult to ascertain with a reasonable degree of reliability which men may, in comparable circumstances, be classed as failures in combat flying. Third, the Aviation Cadet Qualifying Examination was initially designed to take the place of the requirement of formal educational training, not to predict success or failure in combat flying.

Since up to this time it has been impossible to use the criterion of success in combat flying, a reasonable and practical criterion would seem to be graduation-elimination from flying training. Another important consideration leads to this same conclusion; namely, the fact that speed in building up a large force of combat flyers demands that only men who have a good chance of successfully completing their training be selected as aviation cadets.

It is apparent that to determine the most meaningful correlation coefficient between scores on the Aviation Cadet Qualifying Examination and graduation-elimination in flying training, the scores of a large sample of applicants for aviation-cadet training would have to be obtained at the time of their examination in the Aviation Cadet Examining Boards, the entire group would have to be sent without further selection to flying training, and the graduation-elimination records obtained. Such a study was recently initiated and the results should be available shortly. This should provide a valuable supplement to the data regarding the correlation of scores on the Aviation Cadet Quali-

fying Examination with graduation-elimination from flying training which must ordinarily be obtained from seriously curtailed distributions of scores.

To evaluate the efficiency of Test AC10A and subsequently published forms of the Aviation Cadet Qualifying Examination, biserial correlations have been calculated for each group of the various kinds of items used in the examination between the scores of men tested previous to flying training and their graduation-elimination records in pilot training, navigator training, or bombardier training. For many hundreds of individual items tetrachoric correlations between success or failure on the items and graduation-elimination from pilot training have been computed. Since the predictive efficiency of a battery of several tests depends on the intercorrelations of the tests as well as on their correlations with the criterion, intercorrelations of the various kinds of items used in the Qualifying Examination have been obtained from many different samples. For practical reasons, the parts of the Qualifying Examination are not weighted separately when answer sheets are scored in the Aviation Cadet Examining Boards. It is, therefore, necessary to include a number of items in each part that will yield a standard deviation of the proper size to weight each part automatically in relation to the other parts when the total score is obtained by the simple procedure of counting the number of items marked correctly and adding one-fifth of the number of items deliberately omitted.

Description of Forms of the Aviation Cadet Qualifying Examination

Table I provides a summary of the number of items of various types that have actually been used in the Aviation Cadet Qualifying Examination.

The various forms of the Qualifying Examination may be grouped into three series. The AC10 series, which included Forms A through H; the AC12 series, which included Forms I, J, and K; and the AC14 series which began with Form L. All of the examinations in the AC10 series were designed to select navigators and bombardiers as well as pilots. The examinations in the AC12 series, however, were designed to have correlations with performance in pilot training as high as could be obtained with simple, easily administered paper-and-pencil tests. Several factors made it reasonable to change from the AC10 to the AC12 series. In the first place, after the Flight-Officer Act was passed by Congress, not all aviation cadets became commissioned officers upon completion of their training. Some of them became flight officers. This meant that the Qualifying Examination no longer needed to operate partly as a selection device for officers, and permitted the examination to be less of a

TABLE I

CONTENT OF SUCCESSIVE FORMS OF THE AVIATION CADET QUALIFYING EXAMINATION

Type of Items	Number of Items in Forms Indicated						
	AC10A AC10B	AC10C AC10D	AC10E AC10F	AC10G AC10H	AC12I AC12J AC12K	AC14L AC14M	AC14N AC14O
Verbal Tests							
General Vocabulary	45	15	0	0	0	0	0
Technical Vocabulary	0	0	15	15	0	0	0
Reading Comprehension	15	15	15	15	0	15	15
Interest Tests							
Current Events in Aviation and the War	30	0	0	0	0	0	0
Pilot Aviation Interests	0	15	15	19	30	35	31
Bombardier Aviation Interests	0	15	15	7	0	0	0
Navigator Aviation Interests	0	15	15	7	0	0	0
Avocational Interests Related to Aviation	0	0	0	12	5	0	5
Driving Information	0	0	0	0	0	10	9
Perceptual Tests							
Planning Circuits	0	0	0	0	45	0	0
Hidden Figures	0	0	0	0	45	25	25
Point Distance	0	0	0	0	30	0	0
Path Distance	0	0	0	0	30	0	0
Miscellaneous Tests							
Mechanical Comprehension	15	15	30	30	60	60	60
Judgment	15	15	15	15	25	5	5
Mathematics	30	30	15	15	0	0	0
Interpretation of Data	0	15	15	15	0	0	0
Total Items per Form	150	150	150	150	270	150	150

substitute for educational requirements and more an aptitude test for aircrew personnel. Second, the proportion of aviation cadets sent to pilot training was much greater than the proportion trained as navigators or bombardiers. This being so, it was judged most economical of manpower to have the Qualifying Examination select men for aviation cadet training as nearly as possible on the basis of their aptitudes for pilot training and to rely on the aircrew classification tests to screen out men well suited for navigator and bombardier training from among the group already selected for aptitude for pilot training.

To increase the correlations between the total scores of Tests AC12I, AC12J, and AC12K and performance in pilot training, the Mathematics and Reading Comprehension sections used in the AC10 series were omitted, the number of Mechanical Comprehension and Judgment items was increased, and a group of four, timed, perceptual tests was included. After Test AC12I had been published, a comparison of validities was made by correlating the AC10 total scores and AC12 total scores of 1,230 aviation students who took both tests with their performance in primary pilot training. Despite the curtailed distributions (owing to the fact that only men who passed the Qualifying Examination and who obtained high pilot aptitude scores on the Air Crew Classification Tests were sent to pilot training), Test AC12I showed a substantially higher correlation with the criterion.

Several factors influenced the planning of the AC14 series of exam-

inations. Research data indicated that one type of perceptual item, the Hidden Figures items, could be employed successfully in an essentially untimed test. Conflicting evidence regarding the efficiency of other perceptual tests used in the AC12 series and their possible susceptibility to practice effect led to their abandonment in the AC14 series. Additional types of Interest items, on the other hand, were incorporated in the examinations of the AC14 series. Also, Reading Comprehension items were used again.

Results Achieved with the Aviation Cadet Qualifying Examination

Limitations of space do not permit a full discussion of the relationships found between scores on the various types of tests tried out for possible use in the Aviation Cadet Qualifying Examination and performance in pilot, bombardier, or navigator training. Certain trends, however, may be mentioned. Probably the most useful types of items that have been included in the Qualifying Examination are those in the Mechanical Comprehension Section, and the combination of kinds of Information items included in the Interest Section. The correlations of groups of the former with groups of various types of Interest items tend to be about .40. It seems probable that as additional research data become available regarding items testing avocational interests related to performance in flying training, more items of this kind may be added to the Qualifying Examination, in which the various kinds of interest items are grouped together in a part called General Information.

The perceptual tests used in Tests AC12I, AC12J, and AC12K have shown appreciable relationship with performance in pilot training and have low correlations with other kinds of items tried out for use in the Qualifying Examination. The most satisfactory of the four types of perceptual items used in Tests AC12I, AC12J, and AC12K, the Hidden Figures items, is used in the AC14 series in combination with Mechanical Comprehension, Reading Comprehension, and General Information items.

Of the predominantly verbal items tried in the Qualifying Examination, the most useful are those in Reading Comprehension. Items in this field are based on passages typical of those that student aviators and Air Force officers have to read. Beside contributing to the prediction of graduation-elimination in bombardier and navigator training and, to a limited degree, to the prediction of graduation-elimination in pilot training, selected Reading Comprehension items help to insure a certain minimum proficiency in comprehension among aviation cadets. As might be expected, this type of item correlates most closely with performance in navigator training.

Among the miscellaneous types of items listed in Table I, those testing Mechanical Comprehension are, as noted above, most useful for predicting performance in pilot training. Mathematics items, on the other hand, are of greatest value for the prediction of performance in navigator training.

Research studies to determine the value of several types of items not yet included in any form of the Qualifying Examination and to refine the types of items now in use are currently under way. New types of perceptual items and Interest items are being validated and methods of refining the construction of General Information tests. Mechanical Comprehension tests, and Judgment tests are being investigated systematically.

Most of the time devoted to the preparation and improvement of the Aviation Cadet Qualifying Examination is necessarily spent in constructing, criticizing, and editing test items and in carrying out the statistical work required to validate them, to ascertain their difficulty levels, and to determine the best combinations of them for practical use.* Nonetheless, considerable time and effort is allotted to maintaining high standards both with regard to the editorial content and the format; as a result, the test has been remarkably free from criticism, either of specific items or general content and appearance.

BIBLIOGRAPHY

1. FLANAGAN, JOHN C. The selection and classification program for aviation cadets. *J. consult. Psychol.*, 1942, **6**, 229–240.
2. Staff of the Psychological Branch, Office of the Air Surgeon, Headquarters Army Air Forces. The Aviation Psychology Program of the Army Air Forces. *Psychol. Bull.*, 1943, **40**, 759–769.
3. Staff, Psychological Research Unit No. 1. History, organization and procedures, Psychological Research Unit No. 1, Army Air Forces. *Psychol. Bull.*, 1944, **41**, 103–114.
4. Staff, Psychological Research Unit No. 3. Organization and research activities Psychological Research Unit No. 3, Army Air Forces. *Psychol. Bull.*, 1944, **41**, 237–245.
5. Staffs, Psychological Research Unit No. 2 and Department of Psychology, School of Aviation Medicine. Research program on psychomotor tests in the Army Air Forces. *Psychol. Bull.*, 1944, **41**, 307–321.

* The preparation, publication and improvement of the Aviation Cadet Qualifying Examination as well as of the Aviation Cadet Educational Examination and the Flight-Officer Examination are now carried on at Psychological Research Unit #3 by Capt. Frederick B. Davis, Lt. William G. Mollenkopf, and Dr. Mary B. Willis under the general supervision of the Psychological Branch of the Air Surgeon's Office. Others who have also contributed some items for one or more of the later forms include: Major Paul M. Fitts, Capt. Chester W. Harris, Lt. John Dailey, Lt. Frank J. Dudek, Pfc. Leland D. Brokaw, Pfc. John P. Madeira, Mrs. Dorothy C. Bechtoldt, and Mr. William J. McCabe. Civilian consultants have included: Dr. F. J. Brink, Dr. D. V. Bronk, Dr. Truman L. Kelley, Dr. Irving D. Lorge, Dr. Richard E. Vollrath, and Dr. Richard E. Watson.

PSYCHOLOGICAL CONSULTATION SERVICE IN AN ARMY SPECIALIZED TRAINING PROGRAM "STAR" UNIT

BY ROBERT W. HENDERSON, 2ND LT., AGD.

This article describes the activities of nine psychologists in a large "STAR" Unit located in a Basic Training Center (STAR = Specialized Training and Reassignment). Since the type and amount of "professional" work which psychologists in the Army have an opportunity to perform varies with the nature of the organization as well as with the individual's assignment within a unit, a series of "duty-sketches" is presented to indicate how these nine individuals function in a classification unit whose personnel totals 83. Seven of those listed in the "duty-sketches" are classification officers whose training and experience qualify them as Personnel Consultants (**2**, **7**), and much of their work is based on the detection and rehabilitation (or rejection from the Program) of Army Specialized Training Program (ASTP) candidates who are questionable college risks.

The following "duty-sketches" indicate the nature of the duties of these individuals within the "STAR" Unit and suggest that Army needs often coincide with civilian training, experience and interests. (The data in parentheses follows the style of the APA Directory.)

Commander of Unit—Lieutenant Colonel [Lysle W. Croft BS (Ky) 1926, MA (ibid) 1932, PhD (ibid) 1938; Asst Dean, Coll Arts, Sci; Dir, U Personnel Office; Asst Prof, Psychol, U Ky Lexington, Ky.]

Supervises and integrates all activities in Unit; coordinates Unit with Army Service Forces and Army Ground Forces. Duties are primarily administrative, and much of his time is spent in delegating special problems to other officers and passing on their findings. Personally reviews dispositions recommended in all unusual problem cases. Is classification officer of Basic Training Center and is directly responsible for proper classification and assignment of all personnel. Defines the scope of classification and interviewing procedures, lectures to Army personnel, testing of ASTP Trainees, and research.

Executive Officer—Captain [A. Scott Lee BA (Peabody) 1910, MA (Columbia) 1914, PhD (NYU) 1925; Administrator, New York Public Schools.]

Handles most of the non-routine correspondence of Unit such as letters to legislators, army officials and parents. Under the Commanding Officer, directs the Field Selection Board, interprets directives, performs administrative duties.

Chief of Operations—Captain [Carl W. Boyer AB (Muhlenberg) 1923, MA (NYU) 1924, PhD (ibid) 1930; Prof of Ed, Muhlenberg; Dir Ed Dept, Radio Sta WCRA, Allentown, Pa.]

Supervises and integrates the Sections of the Unit that process ASTP trainees in regimental areas (The Initial Interviewing, Testing, "STAR" Selection Board, Final Interviewing and Reviewing Sections). Has direct charge of the work and sees that the policies formulated by the Commanding Officer are followed. Many unusual and difficult classification and assignment problems come to him for disposition or referral.

Member of the "STAR" Board—Second Lieutenant [Stuart Lottier AB (Wayne) 1932, MS (Mich) 1933, PhD (ibid) 1936; Personnel Consultant, Recorder's Court, Detroit, Mich.]

Interviews trainees and assigns them to collegiate curricula and terms by evaluating transcripts, test scores, motivation and other factors. Assists in improving and standardizing "STAR" procedures.

*Personnel Consultant**—Second Lieutenant [Robert W. Henderson AB (Miami) 1932, MA (Akron) 1938; Personnel Res'ch Inst, Cleveland Coll, W Reserve U, Cleveland, Ohio.]

Is Chief of Consultation Service and acts as psychological adjutant to the Commanding Officer. Assigns problem soldiers to Personnel Consultants (including himself) for clinical action and recommendation.

Personnel Consultant—Second Lieutenant [Saul Hofstein BS (Coll City NY) 1937, MS (ibid) 1938, MSW (U Pa) 1941; Psychiatric Social Worker, Phil Child Guid Clin.]

Counsels about half of the problem soldiers referred to Consultation Service. Is responsible for liaison with medical officers, development of clinical activities, and for the section's records and case histories.

Personnel Consultant—Second Lieutenant [Horace H. Corbin AB (Cornell) 1937, MA (Columbia) 1940; PhD (ibid) 1942; Asst instr Psychology, Columbia.]

Divides his time between clinical activities in Consultation Service, and research. Supervises the technical aspects of the Research Section and personally conducts more advanced parts of statistical work on the predictive value of tests used in Unit.

Personnel Technician—Private First Class [Carl C. Steinman BS (Central Normal) 1937, MS (Purdue) 1941; High School, Williamsport, Ind.]

Administers "STAR" group tests. Interviews trainees, and assists in statistical work of Research Section.

Civilian Educational Statistician [Jean Sturgis Ellis, BS (U Delaware) 1942; Public Schools Newcastle, Del.]

Compiles, computes and reports statistics on tests, trainee strength and educational data.

Coordination of Activities

The psychologists of this organization are scattered throughout the Unit and many calls are made upon them for advice on such problems as the evaluation of test scores, morale, "STAR" classification, interviewing procedures, and the techniques of test administration (6). For example, the Private in the Testing Section of this Unit is often asked questions about proper test administration, while the Commanding Officer of the Unit is constantly faced with problems dealing with personnel motivation and morale. Each of these individuals is in a position to function as a professional worker and to promote the efficiency of the entire organization by giving to it the benefit of his training and experience.

* There are three psychologists in the Unit whose principal duty is Personnel Consultant. They and 2 other workers form a Section known as The Consultation Service which is discussed later in the article.

Since it is impossible for a few Personnel Consultants to interview carefully each ASTP candidate (the "STAR" Unit processes as many as 1,000 Trainees per week), all personnel who come in contact with ASTP Trainees must be trained to pick out and refer early those who need individual consideration. Therefore, classes in Interviewing, Personality Army Tests, Test Administration, Military Psychology, and the Personnel Consultant are given to "STAR" personnel. These classes define the function of the military psychologist and emphasize the problems that should be brought to his attention. Also, the Commanding Officer, the Chief of Operations and a Personnel Consultant give talks to the officers and cadre (permanent party) of each training battalion before "STAR" processing begins so that every officer and non-commissioned officer understands some of the purposes and aims of the ASTP and knows where to refer individuals who do not adjust readily to the basic training program.

A Consultation Service

The Commanding Officer of the "STAR" Unit established a Consultation Service to expedite the disposition of the many individual problems that are brought to his attention. For example, all ASTP Trainees whose performance in basic training is not satisfactory must be reported to the Commanding Officer of the "STAR" Unit by the 6th week of the training cycle, and all officers in the ASTP Training Regiments have been given the authority to refer to him any individual (Trainee or Cadre) who is not well adjusted to his particular Army job. The Commanding Officer screens these referrals and turns over to the Consultation Service those which come within its province. The Commanding Officer of the "STAR" Unit is also the Classification Officer of the ASTP Basic Training Center and is in a position to delegate pertinent problems among both Trainees and Cadre to the Consultation Service.

Many large military posts have established sections for taking care of individual problems (**1, 3, 4, 5**). This particular Consultation Service is unique in that it works mainly with soldiers who are above average in intelligence and very young (the majority of the ASTP Trainees at this post are 18 years old). Consequently, most of the cases seen by the Consultation Service are youths who have good academic ability but who have some trait or deficiency which detracts from their success in basic training. The extent to which these trainees improve in military training is the main criterion determining whether they will be retained in the ASTP. For example, "the book-worm" type who has difficulties on the obstacle course because he has never developed good physical coordination is judged mainly on his efforts to do a little better on each performance rather than on an absolute achievement scale. Also, many of

these young soldiers are away from home for the first time in their lives and find the transition from a sheltered home life to the Army a rude shock. Some of the trainees referred to the Consultation Service are homesick; many are frightened by military training and discipline and some exhibit symptoms requiring psychiatric referral. (It is interesting to note that nearly all of those who are diagnosed by psychiatrists as psychotic were passed by Induction Station psychiatrists and that the severance of home ties and the rigors of basic training apparently accentuate personality difficulties.)

The personnel in the Consultation Service is composed of three Personnel Consultants, an enlisted social worker and a stenographer. The approach to all problem cases is clinical and each referred soldier is assigned to a worker who is responsible for making a recommendation based on his findings. When assigned a case, the action of a Personnel Consultant proceeds somewhat as follows:

a. Records of soldier are checked (Service Record, Soldier's Qualification Card, ASTP Personal Data Form, academic transcripts, etc.).

b. Company officers, chaplains, and others who know the soldier are interviewed by phone or personal call.

c. Individual tests are administrated if indicated (Army Wechsler, Rorschach).

d. Soldier is interviewed by Personnel Consultant (modified psychotherapy often produces striking changes as measured by reports from company officers).

e. Soldier may be sent to other agencies such as the American Red Cross, neuropsychiatric clinic, regimental dispensary, or allergy clinic.

f. All information is reviewed and a final disposition is made or recommended.

g. A follow-up is made to determine the adjustment of the soldier and to evaluate the effect of counseling. (A Trainee is usually referred early in the 13 weeks basic training program allowing sufficient time to follow his military adjustment. Those who go to college on the recommendation of the Consultation Service are requested to write back to the Unit listing their grades and making a subjective estimate of their relative success in the college program).

In addition to its clinical activities, the Consultation Service acts as a "clearing house" for all sorts of problems. For example, a Personnel Consultant is on duty during all "STAR" interviews and interviewers are instructed to send to him any individual who presents a special problem. It is standing operating procedure (SOP) for a Personnel Consultant to interview each trainee rejected from the ASTP. These interviews serve as an additional check on the entire classification procedure; give the trainee an opportunity to voice his worries, ambitions, and troubles; and provide a method of referring him further (e.g. to station hospital) if such action is warranted.

It is difficult to assess the value or influence of a small group of individuals in any organization, but the author believes that the activi-

ties briefly described here have improved selection procedures in the Unit by emphasizing the importance of carefully studying any trainee whose record or behavior indicates the need of individual consideration.

BIBLIOGRAPHY

1. BELL, H. M., & ALTUS, W. M. The work of psychologists in the Ninth Service Command Special Training Center. *Psychol. Bull.*, 1944, **41**, 187–191.
2. BELLOWS, R. M., & RICHARDSON, M. W. Training in military psychology; minimum requirements for college courses. *Psychol. Bull.*, 1943, **40**, 39–47.
3. FREEDMAN, H. L. The role of the mental-hygiene clinic in a military training center. *Ment. Hyg.*, N. Y., 1943, **27**, 83–121.
4. GILBERT, G. M. The personnel consultant in an Army Training Center. *Psychol. Bull.*, 1944, **41**, 180–186.
5. MCQUITTY, E. L. A program for the classification and training of retarded soldiers. *Psychol. Bull.*, 1943, **40**, 770–779.
6. Staff, Personnel Research Section, Classification and Replacement Branch, AGO. Personnel research in the Army. V. The Army Specialized Training Program. *Psychol. Bull.*, 1943, **40**, 429–435.
7. Technical Manual 12-406. Officer Classification Commissioned and Warrant. U. S. Gov't. Printing Office, Washington, D. C., 1943.

THORNDIKE, E. L. Man and his works. Cambridge: Harvard University Press, 1943. Pp. 212.

With charming simplicity Professor Thorndike sets forth in these ten short chapters not only what are for him (1) the basic facts of human nature, (2) the laws of learning and (3) the human relations influencing man and his works, but also indicates (4) how this psychology should be applied in the fields of language, government, and philanthropy. The material of this little book consists of the William James lectures which he delivered at Harvard University in the fall and winter of 1942–43. Though in organization and doctrine the lectures follow the author's 1940 book entitled *Human Nature and the Social Order* there is some original matter in the present work, notably the discussion of language.

The arrangement and scope of the volume is clearly indicated in the chapter titles. (1) The genes of the mind, (2) Modification by the environment, (3) Human relations, (4) The psychology of language, (5) The origin of language, (6) Rulers and ruled, (7) Laws and the law, (8) The psychology of punishment, (9) The welfare of individuals, and (10) The welfare of communities.

The three chapters of the first part contain ideas that Thorndike has been expounding for many years. He assumes that the doctrines of his *Original Nature of Man* require no change except verbal reformulation. The essence of chapter I is that man, like other organisms, comes into the world with many of nature's gifts of mind. These innate powers are simply transmitted by genes. Variations of statement concerning inborn tendencies read: The genes cause, the genes provide, the genes link, etc.

As to modification by the environment of what nature gives (chapter II), two and only two forces are necessary—occasion for repetition, and reward. Reward supplies a confirming reaction, a strengthening of connections in the mind, a strengthening alleged to be supported by unknown physiological occurrences.

As stated in chapter III, all complex social behavior is caused in the same way as non-social behavior. The interrelations of buyer and seller, doctor and patient, employer and employee are all explained by tendencies given by the genes and the influences upon them of life's circumstances by repetition of actions reinforced by confirming reactions or rewards.

As a man of excellent will and keen sense of human needs the author proceeds to apply his psychological principles to all sorts of societal problems. As he indicates, however, those principles do not exclusively account for the facts of social life. For example, though the genes provide social instincts they do not make adults obey the aged as happens in societies governed by aged oligarchical males. And so most of Thorndike's discussion of complex problems consists of his own personal opinions and is independent of psychological principles altogether. Certainly his observations concerning social phenomena do not imply his particular psychology. These points are illustrated by the following views. In the realm of law mental age should be used instead of chronological age (137); law will improve itself (144); there is no basic typology (123); there should be fewer laws (341); and, punishment should be minimized (ch. VIII). Only in discussing the welfare of individuals would he stress his principles. Because he believes that three fourths of the variation in abstract intelli-

gence and one half of the variation in health, character, and non-intellectual abilities are attributable to genes, it is necessary, he declares, in order to increase individual welfare to improve the genes.

Since Thorndike's general psychological ideas and his sociologico-statistical techniques have been widely expounded and criticized we need pause only to consider briefly his theory concerning the origin of language. Essentially the theory is that some babble or prattle sound is accidentally connected with an object and then this connection becomes established by repetition and the satisfaction derived from the ensuing meaningfulness of the sound. Perhaps it is no serious criticism to say that as an avowedly speculative statement of how sounds become substitute stimuli for things this theory is in some senses better and in some ways not so good as its pooh-pooh, bow-wow and other competitors. What is more serious is its implication that complex intercommunicative behavior can even in origin be reduced to simple sign-significant phenomena. Here the question arises: Is language a series of sounds or words written or spoken in simple connection with things, or is it a complex performance in an elaborate field involving besides things (including persons) other persons besides the speaker and various conditions. Thorndike's new theory suggests a high probability that he has neglected to keep abreast of modern linguistic developments. The present volume strongly indicates that the reason for this may be that he is more interested in affirming the power of his general principles than in analyzing events.

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YOUNG, P. T. Emotion in man and animal: Its nature and relation to attitude and motive. New York: John Wiley, 1943. Pp. xiii + 422.

In writing this book the author aimed beyond a mere textbook. He "attempted to bring a degree of order into the abundant but highly disorganized assortment of facts relating to feeling, emotion, and attitude." After a chapter which defines the field, three of the other nine chapters are devoted to attitude, motives, and needs. The remaining chapters treat the subjects more traditionally identified with the field of emotion, physiological changes, bodily patterns, development, direct determinants of emotion, and predisposing conditions. The author's method of approach to his subject matter is throughout one of defining the meaning of various abstract terms on a level wholly remote from concrete experimental operations or procedures actually used in investigations of emotion. Factual materials, which are more frequently anecdotal than experimental in nature, are introduced by way of illustrations of the words or the relations between words previously defined. The book is not an adequate review of either theoretical or experimental works on emotion. Experimental materials where introduced are treated only superficially. If one were to use this book as a text he would rely heavily on the references appended to each chapter as outside readings in the course. Almost everything in the book is handled in subordination to the attempt to bring new order and organization into the field; and it is appropriate that it be judged with respect to its contribution to theory.

Emotion is defined as "a disturbed state of the organism" (28). When "emotion arises, integrated activity is hindered in some way or other." This definition, which the author admits is arbitrary (37), is held in spite of the patently contradictory fact, also recognized by the author, that every particular emotion is characterized and identified by a form of purposeful, integrated activity. The apparent contradiction the author believes he solves by the simple expedient of pointing out that an event can be observed from many differ-

ent viewpoints. Looking at behavior in search of "disturbance" is the emotional viewpoint; looking for integrated action is the non-emotional view. In this connection, a sharp distinction is drawn between "emotion" and "emotional behavior," the former meaning upset, the latter integrated action.

This solution to contradictions, namely, that of simply saying that the contradictory elements are products of different viewpoints, without any attempt to construct higher-order concepts as syntheses, is called the "attitudinal approach." As a consequence the book is replete with contradictions. Even the attitudinal approach itself is defined in two different ways. On pages v and 73 it is fairly clearly defined as a form of "eclecticism," a method of tying together "diversified facts" on the assumption that "they are multiple aspects of a single psychological event." Yet in a chapter in which attitude is defined as an individual's predisposition to action, the attitudinal approach is described as "an analysis of the attitudes and motives of an individual" (111).

The table of contents and sub-title of this book are likely to arouse an eager response in the trained psychologist, an eagerness for a sound theoretical rapprochement, which is sorely needed at present, between the concepts attitude, motive, need, etc., on the one hand, and the concept of emotion, on the other. However, beyond a few meaningless generalities, in which the intimacy of the two is either stated or implied, and illustrative anecdotes, many from his own personal experience, the author offers no real theoretical structure which relates the two. The following are examples of the hazy generalities which the reader is expected to be satisfied with. "The concepts of *motive* and *attitude* overlap since both have an influence in directing the course of behavior; yet each concept is distinct and different from the other in some respects" (66). "The psychologist distinguishes between emotions and attitudes, but recognizes that the two are intimately related. On the one hand, many attitudes predispose the individual to emotional upsets, and, on the other hand, an emotional upset may leave the individual with changed attitudes" (110). "Appetites and emotions are intimately related in that both rest upon organic processes, including changes in the viscera" (115). "Attitudes, motives, and states of conflict, built up in the past, furnish the background out of which present feelings and emotions arise" (402). And " . . . emotions and attitudes are intimately related, and the conscious emotion is often associated with conscious attitudes. The attitude is a *part* of the total emotional experience but by no means the whole of it" (300).

This vagueness and confusion of concepts and the relations between concepts are in part the consequences of the even tenor of abstract discursiveness which is held throughout the book, without one lapse into the realm of the operationally defined. The exact definition of the key concept "disturbance" itself is far from clear. Although the disturbance, which constitutes emotion, is usually stated to be a disruption of a process which is going on when the emotion occurs, occasionally (116) it seems that the disturbance *is* the newly aroused response pattern. The book is full of generalities about emotion which flatly contradict this disruption postulate, such as for example, the statement that "excitement sometimes facilitates a skilled performance and sometimes interferes with it" (30).

If the intelligent reader is not already aware of the confused state of the field of emotion, he will certainly be left with that impression after reading this book.

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WALLS, G. L. The vertebrate eye and its adaptive radiation. Bloomfield Hills, Mich.: Cranbrook Institute of Science, 1942. Pp. xiv + 785.

This book provides an account of the eye and its capacities from the standpoint of general biological utility, rather than from the more conventional standpoints of anatomy, physiology, ophthalmology, psychophysics, psychophysiology, histology, or pathology. In the development of this conception of biological utility, the author draws from knowledge that has accumulated in a number of different special fields.

The book "is not designed as a reference book, in which to 'look up' small points from time to time. Rather, it has been written in the style of a textbook, though for a course which has yet to be given in any American university. . . . The material of the book is progressive." (v)

The eye serves the general function of mediating adaptations to surroundings *via* reaction to light. Light reflected, or transmitted, from an object is received into the vertebrate eye through a compound optical system. The essential elements of this system—cornea, iris, lens, retina—subserve various special ocular functions, and are so organized as to suit the incoming bundle of light rays to the biological needs of the organism, i.e. to the eventuation of the chain of neural events which mediate the adaptive response.

The book is divided into three principal parts, each containing six chapters. Part I is "basic" (139 pages); Part II, "ecologic" (410 pages); and Part III, "synoptic" (136 pages). There is an extended bibliography (24 pages), and a detailed index and glossary (64 pages). The book contains 197 illustrations.

The six "basic" chapters are largely concerned with descriptions regarding structural and functional characteristics in a standard (human) eye. The mechanisms for light control, accommodation, and image formation are described. The retina and its terminal elements are characterized in detail. Although these descriptions include much anatomical detail, the discussions are designed to bring out the biological uses of these structures. A few of the more noteworthy points regarding function are mentioned here. A clear distinction is drawn between acuity and sensitivity. Trichromatic vision is indicated to depend upon a central mechanism, and color blindness is ascribed to subnormal differentiation with respect to response to wave length. The positive assertion that the cone is an "older and more primitive" retinal element than the rod comes as a surprise. The two final chapters in this section "The Genesis of the Vertebrate Eye" and "Elements of Vertebrate Phylogeny," seem to the reviewer to be so largely concerned with speculative deductions as to contrast sharply with the essentially factual material treated in earlier chapters.

The adaptive function of the eye is explicated in six long chapters in Part II (141–551). The vertebrate eye has had to accommodate itself to the needs of seeing under diverse physical conditions (in water, on land, in the air, at night, at twilight, in the daytime), and structural modifications have emerged to meet special needs. Modifications brought about to favor vision under one kind of external condition have often not aided observation under other conditions. The yellowishness in the lens, e.g. of the prairie dog, aids diurnal but hinders nocturnal observation. The visual requirements for one kind of condition are sometimes the converse of those for another. The nocturnal eye exhibits increased sensitivity and decreased acuity, while the diurnal eye possesses decreased sensitivity and improved acuity. In other cases, a new condition has been responsible for the appearance of a new structure, e.g. the appearance of spectacles in lampreys, fishes, and reptiles. Ocular differences regarding oil-

droplets associated with retinal elements, eyelids, extent of visual field, shape of contracted pupil, relation of principal dimension of lens to that of the eyeball, and many other features are described and evaluated with respect to particular vertebrate needs. Although the function of many structures, e.g. twin cones, green cones, tapetum lucidum, cannot yet be definitely specified, the author makes the unqualified assumption that all ocular differences are the consequence of ocular response to special visual needs.

The title "Adaptations to Space and Motion," used for one of the six chapters in Part II, is hardly specific enough; at least, it is patent that all six chapters are directly concerned with adaptations to space. Moreover, the chapter just mentioned and one on "Adaptations to Photic Quality" are largely concerned with rather restricted and special kinds of spatial adaptation—not with the general adaptations treated in the other chapters which animals make in free space.

The six chapters that make up Part III are concerned with detailed descriptions of the eye as a whole, and of the retina in particular, in various representatives of the six chief classes of vertebrates (cyclostomes, true fishes, amphibians, reptiles, birds, and mammals). The treatment throughout these six chapters is essentially restricted to morphological details, and, aside from rather protracted discussions concerning pectin in the avian eye, and the absence of muscular elements in the iris of certain fishes, does not bring out the way that the adaptive function is served. Coming at the end of a work that stresses the use of the eye, these anatomical descriptions are at odds with the conventional practice of using anatomical descriptions as a preparation for discussions concerning function.

With regard to the author's professed ambition to produce a "progressive" treatment of the vertebrate eye and its performances, the present reviewer feels bound in all honesty to submit the pronouncement that he has not succeeded. This judgment is based on several considerations. The three parts of the book do not truly represent a progressive development, but are concerned with three essentially diverse aspects of the eye and vision. As has been indicated already, Part I is essentially an elementary treatment of the structure and function of the human eye, Part II reveals how the eye has met the need of providing for seeing under diverse physical conditions, and Part III furnishes detailed anatomical descriptions of eyes typifying different classes of vertebrates. Moreover, the discussions in the three parts of the book seem to be suited, not so much to the needs of the general reader ("college and graduate student and amateur naturalist"), as those of three essentially different classes of specialists. Part I seems best suited to the needs of the psychophysiologist, Part II will appeal most to biologists and genetic psychologists, and Part III chiefly to comparative anatomists. Finally, in spite of the stress which the author aims to place upon the biological function of the eye, he has failed to develop the idea of the adaptive function of the eye in a progressive way. This is largely due to the fact that Part III is so strictly concerned with the anatomical minutiae which differentiate the various classes of vertebrates. Certainly, the impression is not given that the final six chapters were written in the interest of completing the treatment in Parts I and II.

The book fails to fulfil expectations in another important respect. The author stresses the functional interdependence which exists between the eye and the brain, stating that "our eyes do not see; but we see with our eyes" (2) and that "human vision . . . is the product of a complex brain teamed with a

relatively simple eye" (5); however, his characterization of the way that the brain is involved in seeing is utterly insufficient. About all that he does in this regard is to indicate that the optic nerves partially decussate in passing posteriorly (51 f.), that trichromatic vision depends on a central mechanism (91 ff.), and that "binocular single vision" is based on an involved integration of neural events in the occipital cortex (323 ff.). After indicating in these ways that, functionally speaking, the eye and the brain constitute a unit, it is disappointing not to find some characterization regarding the anatomy and neurophysiology that is involved in the posterior part of the visual mechanism in seeing. A better attempt also needs to be made to relate visual acuity, visual sensitivity and other capacities to the occipital cortex.

This neglect is not to be excused on the ground that the occipital cortex is not a part of the eye. The essential unity of the development of the visual mechanism in its entirety is indicated through experiments involving the methods of extirpation and grafting. When an eye is removed early in individual development, the visual centers in the midbrain and in the occipital cortex fail to develop normally; when a much larger eye is substituted, the involved centers in the brain become overdeveloped. After the author has openly professed admiration of a number of workers who recently have been contributing to our knowledge concerning electroretinograms, electrically recorded optic nerve discharge, and cortical response, it is all the harder to understand the utter disregard of these data. These data are not to be suppressed, or avoided, on the ground that their meaning is not yet very clear, because about 50 per cent of the data already included in the book would on the same ground have to be suppressed or avoided. It is essential that they be brought together in so far as possible as basic to the general problem of organic adaptation. If these newer data concerning events in the posterior part of the visual mechanism had been briefly characterized, the book would bear the mark of a more complete treatment of the adaptive function of seeing.

Dr. Walls has laid a broad groundwork for the study of the eye and its functions. The use of the comparative method gives breadth of scope, and the utilization of the genetic method provides perspective. Students of vision will find many places where the plan is only sketchily outlined. The thread that binds together the structure erected on this broad base is the practical consideration of the biological utility of the eye. The completion of this structure will still require countless man-hours on the part of workers in all phases of visual science.

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BURTT, H. E. Principles of employment psychology. (Rev. Ed.) New York: Harpers, 1942. Pp. xii+568.

This volume is a revision of the original edition which appeared in 1926. It is a text for students preparing for industrial or personnel work and for industrialists interested in employment psychology. While the topics in this edition differ little from those formerly treated, the material has been essentially re-written. Rating scales, job analysis, vocational interests, trade tests, job criteria, test administration techniques, and intelligence as vocational aptitude are the subject matter of individual chapters. A history of vocational psychology and of pseudo-scientific methods of personnel selection constitute two chapters. Test construction and problems of validation occupy three more. The

application blank, oral interview, letters of recommendation, et cetera, compose an additional chapter.

As a tool for personnel and industrial relations men, this book contains little that has not already been stated elsewhere, and possibly more cogently. Moreover, topics of importance to such workers are either left untreated or are superficially handled. For example, a personnel man has the legitimate right to seek of such a text the answer to the question: How valuable are current personality tests in a selection program and which test is recommended? Less than ten pages of the 568 in the book are devoted to the measurement of personality and these are almost entirely enumeration and description. A brief paragraph is given to the Humm-Wadsworth Temperament Scale, a comparatively well known test in industry. Item analysis as a procedure for the selection of test items is nowhere treated. Problems of testing the handicapped, admittedly of contemporary importance, are largely ignored and special test techniques required in public personnel selection are nowhere to be found.

Where the above limitations occur because the text was designed for students and not for experienced personnel workers, the valuations expressed are of course of secondary importance. A serious difficulty, however, regardless of the level of reader intended, is the stress placed upon the difference between aptitude and achievement—innate on the one hand and acquired on the other. This logic forms the framework of the book and creates an unusual emphasis upon aptitude to the exclusion of proficiency in employment testing.

In maintaining this dichotomy, the author is continually forced to such concepts as reaction time, memory, and attention as measurable aptitudes. In the selection of personnel, it is of little consequence whether innate or acquired factors are measured, or what labels are attached to them, if the test instrument permits prediction of the criterion. As a matter of fact, a number of widely-used aptitude tests are actually achievement tests. In this connection it may be pointed out that the field of public personnel selection, certainly within the scope of employment psychology, is almost entirely so-called proficiency testing.

For instructors of industrial or personnel psychology seeking a textbook, this volume is probably the most definitive treatment of the psychology of selection to be found within one set of covers—and more or less attuned to the level of a first course. For this and other commendable reasons it will undoubtedly be found useful in the classroom.

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California State Personnel Board.

LEVY, D. M. Maternal overprotection. New York: Columbia Univ. Press, 1943. Pp. xi+417.

A sober attempt to give a true picture of the wide dimensions of the problem of maternal overprotection has led to a unique method of treating clinical data in this book. From a total of approximately two thousand clinical cases passing through the Institute of Child Guidance, twenty cases of pure overprotection were selected by the application of four criteria: (a) excessive contact between mother and child, (b) prolongation of infantile care, (c) prevention of independent behavior by maternal interference, and (d) lack or excess of maternal control. Because of the rigidity of this selection, the author assumes that these twenty children can be taken as truly representative of overprotected children and proceeds to give an intensive analysis of their behavior, their traits, their problems, and later adjustments.

The treatment of the material provides a refreshing contrast to the all too common tendency to select portions from case materials for the obvious purpose of supporting some particular thesis. Very little space is given to theories; instead the ramifications of the mother-child relationship are presented with almost bewildering concreteness.

Levy gives a mass of specific material illustrating excessive contact in such situations as prolonged nursing care, excessive fondling, and sleeping with the mother long past infancy; he illustrates the prolongation of infancy by citing instances where the mother helps her thirteen-year-old son to dress, where she gets bread and water for a twelve-year-old boy, where she puts her adolescent son to bed in the middle of the afternoon as a means of punishing him for some trivial misdeed; he cites instances where the mother actively prevented the child from making any social contacts outside the home; and gives numberless instances of failure of discipline.

As the reader absorbs these many illustrations he comes to the natural conclusion that the trouble lies primarily in the affect hunger of the mother. He is led up to this point of view in such easy stages and is finally introduced to it so tactfully that he finds in himself a sort of feeling that he already knew that this was the answer to the whole situation.

At this point Levy almost undoes his subtle treatment by going into some of the extreme theories about the underlying drives of mother love. However, he gets safely through this morass by discounting these extreme views and takes the reader into the problem of treatment.

The section on treatment is characterized by the same straightforward honesty that permeates the examination of the case materials. He states frankly that direct psychotherapy was uniformly unsuccessful regardless of the number of interviews held or what variations in method were employed by the staff of the Institute. The reader is not unprepared for such a confession, having been led to discern that the mother was so anxious, in most of the cases, to prolong her protection that she would naturally resist any attempt to break her hold on her child. The mothers would not submit to any form of psychotherapy and the only successful methods were those which were carried on without her cooperation. The best treatment was to remove the child from the mother, others were the encouragement of contacts outside the home, the increase of the father's prestige in the home, and home demonstrations of better methods of dealing with concrete situations. The final cure came spontaneously in a number of cases with the maturation of the child.

The experimentalist who reads this book may complain that Levy had no adequate control group against which to check his findings, the statistician will find no statistical validation of the rather frequent use of percentages, and the logician may question the validity of using twenty cases selected in a rather easy manner as representative of a unified class to be designated an overprotected group. But Levy has guarded himself against such criticisms by making no attempt to appeal to any of these three types of persons. He has taken clinical material, subjected it to a screening process, and then has made as near an objective study of the cases who came through his criterion sieve as could well have been done.

JOHN J. B. MORGAN.

Northwestern University.

BOOKS AND MATERIALS RECEIVED

BACON, S. D. Sociology and the problems of alcohol. Memoirs of the section on alcohol studies Yale University No. 1. New Haven: *Quarterly Journal of Studies on Alcohol.* 1944. Pp. 53.

BLUM, M. & CANDEE, BEATRICE. Family behavior, attitudes and possessions. Research Study No. 4. New York: John B. Pierce Foundation, 1944. Pp. 209.

BOWLEY, AGATHA H. *Guiding the normal child.* New York: Philosophical Library, 1944. Pp. xv+174.

CALLAGHAN, JANE & PALMER, CATHERINE. Measuring space and motion. Research Study No. 5. New York: John B. Pierce Foundation, 1944. Pp. 46.

CALLENDER, J. H. Introduction to studies of family living. Research Study No. 4. New York: John B. Pierce Foundation, 1943. Pp. 22.

FLEMING, G. W. T. H. (Ed.) *Recent progress in psychiatry.* Special number: The Journal of Mental Science. London: J. and A. Churchill, LTD. 1944, Vol. 90, No. 378. Pp. 509+xii.

KLEIN, D. B. *Mental hygiene: The psychology of personal adjustment.* New York: Henry Holt, 1944. Pp. xiii+489.

KRAPF, E. E. Tomas de Aquino y La Psicopatologia. Monografias de "Index de Neurologiu y Psiquiatria, No. 2. Buenos Aires: R. Orlando, 1943. Pp. 43.

LEPLEY, R. *Verifiability of value.* New York: Columbia Univ. Press, 1944. Pp. ix+267.

MANN, CECIL W. (Chairman) Postwar educational planning. Progress report of the Commission on Postwar Planning. Baton Rouge: Louisiana State Univ., 1943. Pp. 74.

SALTER, A. *What is hypnosis: Studies in auto and heteroconditioning.* New York: Richard R. Smith, 1944. Pp. vi+88.

SARGENT, S. S. *The basic teachings of the great psychologists.* New York: Garden City Publishing Co., 1944. Pp. xiv+346.

SHARP, AGNES A. (Ed.) A dynamic era of court psychiatry, 1914–1944. Chicago: The Psychiatric Institute of the Municipal Court of Chicago, 1944. Pp. 149.

ABC's of scapegoating (with a foreword by G. W. ALLPORT.) Chicago: Central YMCA College, Chicago, 1944. Pp. 72.

Science and the future. Essays of the winners of the Westinghouse Science Scholarships in the Second Annual Science Talent Search. Science Service, 1719 N. St., N. W., Washington 6, D. C.

NOTES AND NEWS

News of the death of the following psychologists has been received by the Secretary of the American Psychological Association:

V. V. CALDWELL, Dean, Director General Extension Division, Oregon State System of Higher Education, Portland, Oregon, on November 4, 1943.

SIDNEY A. COOK, professor of psychology, New Jersey College for Women, New Brunswick, New Jersey, on February 4, 1944.

GILBERT V. HAMILTON, 824 Moreno Road, Santa Barbara, California, on December 16, 1943.

JOSEPHINE M. SMITH, 1413 Salem Hills Drive, Rock Hill Village, Missouri, on May 5, 1944.

COMMANDER ALVIN C. EURICH, USNR, who has been on leave from his post as professor of education, Stanford University, has, at the request of the university, been placed on inactive duty by the Navy to enable him to accept the academic vice-presidency of the university. He will continue to serve in an advisory capacity with the Navy.

The John Simon Guggenheim Memorial Foundation has announced the award of Fellowships for the year 1944–45. Among them is an award to DR. T. C. SCHNEIRLA, associate professor of psychology, New York University, and associate curator of animal behavior, the American Museum of Natural History, New York City, for a study of the relationship between instinct and learning in insect psychology. The work will be based chiefly on his study of the behavior of army ants on the Isthmus of Tehuantepec, Mexico.

WILBERT S. RAY, of the department of psychology at Hillsdale College (Hillsdale, Mich.), has been appointed professor and chairman of the department of psychology at Adelphi College (Garden City, N. Y.) and is already in residence at Adelphi.

RUTH WHITE BEEBE has been appointed resident psychologist for the Child Study Center of Maryland, with headquarters in Baltimore.

FORREST H. KIRKPATRICK, dean of students, Bethany College (Bethany, W. Va.), who is on leave of absence for service with the RCA Manufacturing Company, is now in charge of personnel administration for the seven plants of the corporation. He is responsible for "developing the organized structure, procedures, and policies for the personnel department in each plant and for the over-all coordination and leadership in this field."

ROLAND L. BECK, director of the demonstration school, Central State College (Edmond, Okla.), has been granted leave of absence for the duration of the war to serve as chief, Research, Testing, and Efficiency Ratings Unit, Office of the Chief of Engineers for the Army, War Department.

ELI LILLY, of Indianapolis, has made a gift of $2500 to the Character Research Fund of Union College. This is Mr. Lilly's second large gift for this project. In 1941 he gave $5000 for the same purpose. The Character Research Project is being conducted under the leadership of ERNEST M. LIGON, associate professor of psychology of Union College, and is a cooperative investigation involving the Laboratory of Psychology of Union College, the Westminister Presbyterian Church of Albany, New York, and the First Reformed Church of Schenectady, New York. The first major phase of the investigation has been completed and this gift makes possible the inauguration of the second phase. The Character Research Project is designed to study the roles of all three major

institutions involved in character development: the home, the school, and the church.

A. R. LAUER, of Iowa State College, was guest lecturer at the Psychological Museum, 1951 West Madison Street, Chicago, on March 23 and 24, 1944, and gave a series of lectures devoted to psychology in relation to accident prevention. An exhibition of apparatus used to study traffic safety was made. A demonstration of various scientific phenomena of the senses, central processes and response mechanisms was made by DAVID P. BODER, who is director of the Museum, which cooperates with the Illinois Institute of Technology.

The Wichita Guidance Center (Wichita, Kans.), formerly called the Wichita Child Research Laboratory, has issued a general information bulletin describing the Center's history, purpose, types of problems, methods of study, cost of services, methods of referral, board structure, and staff and duties. This can be obtained by addressing the Center at 3422 E. Douglas, Wichita 8, Kansas.

In addition to the regular program of graduate study in speech pathology, the State University of Iowa will feature in its 1944 Summer Session an intensive four weeks' course in Audiometry and Fitting of Hearing Aids from June 26 to July 22. There will be three hours daily of practical laboratory work, supplemented by three hours of lectures. Running concurrently with this intensive course, will be a conference series on Speech and Hearing Rehabilitation each week-end from June 23 to July 22. These conferences will discuss the various phases of speech and hearing rehabilitation in both its civilian and military aspects. For details write WENDELL JOHNSON, Director of the Speech Clinic, at the State University of Iowa, Iowa City, Iowa.

The United States Civil Service Commission has announced that trained occupational therapists are needed in Army and Veterans' hospitals within the United States. While the greatest demand is for experienced graduates of accredited occupational schools, there are some positions for which college training in psychology and in arts and crafts or trades and industries may be substituted for training in occupational therapy schools. The salary range of these positions is $1970 to $2433 a year, including overtime pay. Those appointed at $1970 will be trainees for a period of 18 months; those appointed at $2190 and $2433 will administer occupational therapy under medical and general supervision, in Army and Veterans' hospitals. There are no age limits and no written tests, but applicants must be physically capable of performing the duties involved. Persons now using their highest skills in war work should not apply. Federal appointments are made in accordance with War Manpower Commission policies and employment stabilization programs. Further information on Occupational Therapy Aide positions and forms for applying can be obtained from first- and second-class post offices or from the United States Civil Service Commission, Washington 25, D. C.

The Civil Service Commission of Wayne County, Michigan, announces a nation-wide examination for Psychologist I, to fill a current vacancy in a 4000 bed mental hospital near Detroit. Both men and women are eligible. Minimum requirements include citizenship and graduation from an accredited college or university with a major in psychology. Desirable additional qualifications to be appropriately weighted are a Master's or Doctor's degree and clinical experience. The position pays $2640 to $3120 a year (based on a 40 hour week). In addition to filling the position mentioned, the examination will also provide a list of eligibles for positions as psychologist in a child guidance clinic and in a training school for retarded children within the county. Arrangements

will be made for the local examinations of applicants living outside Detroit. Interested parties should write immediately to the Civil Service Commission, 2200 Barlum Tower, Detroit 26, Michigan, for application forms.

Technical Translations Clearing-House. The American Documentation Institute announces the organization and operation of a Technical Translations Clearing-House to supply a service for microfilm and photographic copies of translated articles from foreign psychological journals, and a service for information about existing pools of such translations located at various points in the United States. The Institute requests information from psychologists as to the location of translated materials in foreign psychological journals or periodicals published since the beginning of 1940, either in the personal possession of scientists or in public institutions or commercial collections. The Institute will publish a list of translations available which will be given a wide distribution. Translations will be reproduced at standard copying cost in microfilm or photo copies. Psychologists with translations available or interested in this service should address the American Documentation Institute at 1719 N Street, N.W., Washington 6, D. C.

Boas Memorial Collection at Northwestern University. Northwestern University has recently acquired the collection of books and reprints that constituted the working library of the late Professor FRANZ BOAS of Columbia University. The books and periodical sets number more than 5,000 volumes, while reprints total 10,000. It is planned to make the Boas Memorial Collection, an anthropological reprint center to which anthropologists and those in other fields will be asked to contribute reprints falling with Professor Boas' field of interest. MRS. ALTA GUSAR has been added to the staff of the library as curator of the Boas collection and is at present cataloging and classifying the reprints. The collection is rich in all fields of anthropological concern—physical and cultural anthropology, archeology, and linguistics, according to Professor MELVILLE J. HERSKOVITS of Northwestern. Linguistics is represented by a large collection of grammars of primitive tongues, while samples of primitive art comprise a full representation of materials in the field. Because of Professor Boas' interest in psychological questions, particularly those concerned with racial differences and problems of growth and development, the library is expected to yield much of value to psychologists. It is hoped that those working in this field will forward their reprints to the library. They may be addressed to the Curator, Boas Memorial Collection, Deering Library, Northwestern University, Evanston, Ill.

Research Council at Rutgers. Rutgers University announces the creation of a Research Council to strengthen and promote research throughout the university. A special research fund has been placed at the Council's disposal. Applications for grants are now being considered. The Council contemplates the development of a well-balanced research program in business, the social studies, the humanities and the sciences. The Council consists of nine members, representing various colleges and fields of learning in the University. The Director is WILLIAM H. COLE, professor of physiology and biochemistry, who will serve in a staff relationship to deans, department heads and faculty members concerning research programs, and will represent the university in developing reciprocal arrangements with governmental, industrial, business and professional institutions outside of the university. Emphasis will be placed upon cooperative research between related departments in the university and between outside organizations and university departments.

James McKeen Cattell Grants-in-Aid of Research. The Psychological Corporation offers for 1944–1945 the James McKeen Cattell Grants-in-Aid of Research in Applied Psychology, including industrial psychology, personnel, labor relations, social psychology, marketing, advertising, tests and test construction, morale, public opinion, propaganda, clinical psychology, and the psychological aspects of related disciplines. These grants are primarily available to students who have completed all or practically all course work for their doctoral degree in some field of applied psychology, and whose research projects have already received faculty approval. Post-doctoral applications, however, will also be given consideration. The principal purpose of these grants is to add to research already under way by increasing the scope of the study or by permitting more intensive analysis of the data. For example, these funds may be used to cover expenses such as the hiring of more observers, interviewers or testers; to defray the cost of additional statistical analysis (e.g. make possible the use of punched card equipment); or to pay for additional clerical aid. The grants may not be expended to cover living expenses nor to defray the cost of publication. They may not ordinarily be used to pay for standard laboratory apparatus, books, manuscript materials, or travel to scientific meetings. The amount of each grant is nominally $250. The committee is, however, empowered to increase or decrease the amount of this grant. The closing date for the receipt of applications for 1944–1945 on forms provided by the Grants-in-Aid Secretary is July 15, 1944. Grants will be announced September 1, 1944. Applications will be examined and awards granted by the James McKeen Cattell Grants-in-Aid Committee, which consists of ROSE G. ANDERSON, GEORGE K. BENNETT, HARRY D. KITSON, A. T. POFFENBERGER, WALTER R. MILES, *Chairman*, and ALBERT D. FREIBERG, *Secretary*. Application forms may be obtained from the Grants-in-Aid Secretary. It is requested that application blanks be secured well in advance of July 15, 1944, so that there will be ample time to fill out and return them before that date to the *Grants-in-Aid Secretary, The Psychological Corporation, 522 Fifth Avenue, New York 18, N. Y.*

Notice. A number of members have requested us to reproduce the list of officers of the Association who are in frequent correspondence with members, in the manner in which they appear on page four of the Yearbook. Questions concerning the personnel and the addresses of the Officers and Council Members of the Association frequently arise. Hereafter, as space permits, this list will appear on one of the cover pages of the *Bulletin* and will be kept up to date as changes take place.